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MARCH, 1936

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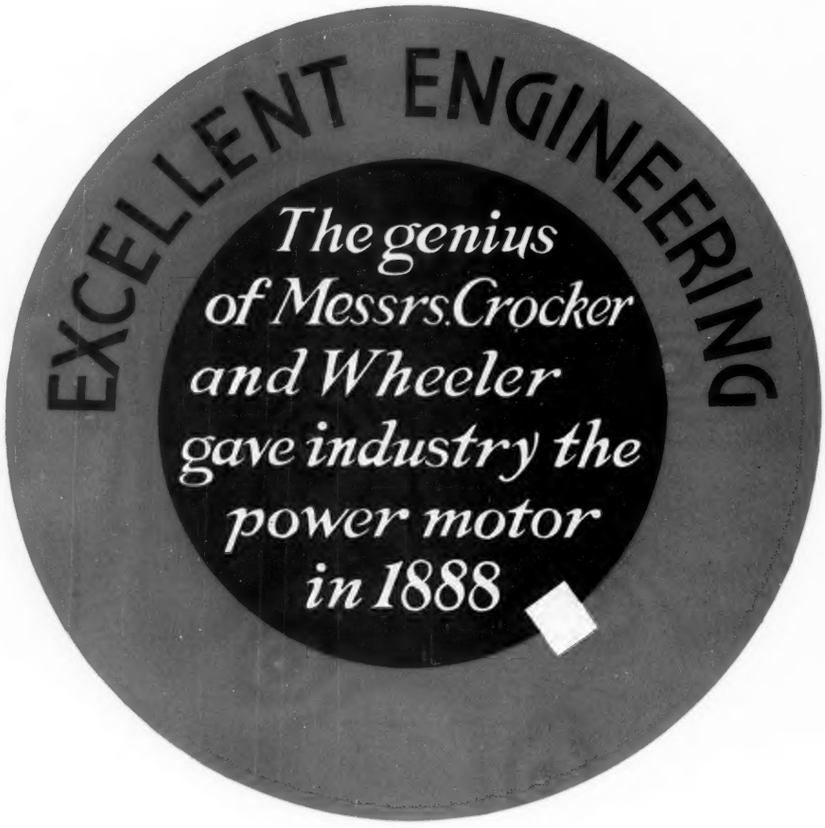

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FOOD INDUSTRIES

PRODUCTION • ENGINEERING • DISTRIBUTION

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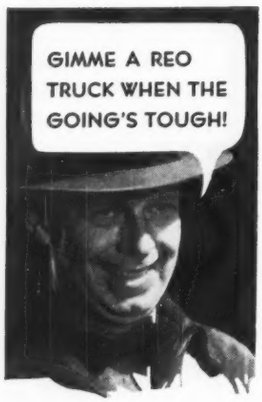
GANGWAY FOR A REAL TRUCK

THE NEW 1936 REO



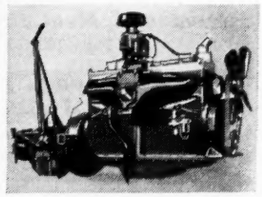
Reo Speedwagons and Trucks range from ½ to 4-6 tons. Prices from $445 up, chassis f. o. b. Lansing, plus tax. **½-Ton Chassis, f. o. b. Lansing, plus tax.*

GET a truck with a tough motor. Get one that's designed to stand up under merciless pounding, day-in-and-day-out. Get a 1936 Reo with one of the toughest, most capable truck engines ever built.

Drivers prefer the new Reo Gold Crown and Silver Crown truck engines. They know that these sturdy, responsive motors will "take it" without grumbling. And owners like them because they stay in service, with typical Reo dependability.

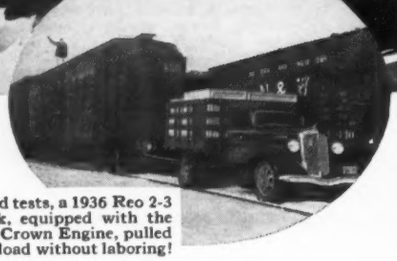
All the heavy duty models of the new Reo have husky, 7-bearing crankshafts—in many, 2-Speed rear axles, 5-Speed transmissions and double-reduction axles are now available. See the new Reo Trucks for 1936 before you make *any* truck investment. Your nearest Reo dealer will show you how a Reo can save you plenty of money. Make it a point to call him today!

Climbing grades up to 45%! Two Reo trucks, loaded to full rated capacity, climb Stone Mountain over rocks and boulders.



All Reo Speedwagons and Trucks are powered with rugged, economical, Reo-built Gold Crown or Silver Crown truck engines. For 1936, these famous motors have been made even more efficient.

America's Toughest Truck!



In repeated tests, a 1936 Reo 2-3 Ton Truck, equipped with the Reo Gold Crown Engine, pulled an 80-ton load without laboring!

REO SPEEDWAGONS AND TRUCKS

FOOD INDUSTRIES

PRODUCTION • ENGINEERING • DISTRIBUTION

Established 1928—McGraw-Hill Publishing Company, Inc.

Vol. 8, No. 3

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Laurence V. Burton, Editor

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MARCH 1936

THE TALK OF THE INDUSTRY

YOU are invited to attend a luncheon at the Packaging Conference at the Pennsylvania Hotel, New York, on Tuesday, March 3. Subject for discussion is "Standards for Protective Materials." Mr. C. A. Southwick of the Engineering Research Department of General Foods Corporation is to be the discussion leader. This department has been inveigled into presiding, pontifically. Come along and bring your ideas about the right way to choose the right material for a package.

ABOUT every so often some overserious or embittered person takes us to task for our failure to get properly "het up" over his mental picture of whither mankind and civilization are going. And, under pressure, we would admit that once or twice we have had to scurry to the

dictionary to look up the meaning of such terms as Bourbon or Tory that have been hurled at us in order to decide whether we were being kidded or insulted.

There have been times when we have speculated on what life would be like should the dire predictions of our jeering opponent in debate be realized; whether the said opponent would have us "liquidated" or put to work at some uncongenial task or thrown out to beg, as he has threatened.

Yet when we read the fairly recent dispatches from Moscow telling of how one of the food trusts is forced to advertise to the Russians to persuade them to buy its foods the resulting thought is that life for us, at least, will not be a whole lot different from the life we now know. We shall resume our refusal to get "het up" by soap box oratory, but we shall not fail to exercise our franchise, liberty and such powers of persuasion as we may possess toward guiding the thinking of our fellow man along, what we modestly believe to be, constructive lines.

JUST why someone should send us a menu for a festival dinner, it was Christmas if memory serves, asking for our comments, is inexplicable. For fear that others may ask for our opinion on their idea of good things to eat, let them be informed that they do so at their own peril!

In this particular meal the feature was turkey, stuffed with—of all things—oyster dressing.

There is a combination that this department dislikes just as much as it dislikes bread pudding. We like oysters, and we like turkey; but to combine them is as barbaric as mustard on watermelon, pineapple and macaroni, or maple syrup on oysters.

IMAGINE our annoyance at being rudely—nay, crudely—eyed up and down several times by the beady-eyed secret service man on duty at the door of F.D.R.'s office in the White House last month. The nonchalance of one's hands in one's pants pockets evidently was disturbing to official decorum. But, though we got away with it, the man behind us was ordered to take his right hand out of his coat pocket, after which his coat was slapped to see if he carried any heavy object therein.

WHAT to do with our soldiers' bonus is the problem that is adding more gray hairs to this department's head. About fifteen years ago, we recall, we chucked into the

lock-box a bit of engraved paper calling for $1,500 along about 1945. If we cash it this year the probability is that we shall ultimately have to pay out double its face value in future taxes just to cover this one item. And if we don't cash it, the taxes will have to be paid out anyhow. And right now we are speculating on how good the nation's currency will be about nine years hence.

LIFE has a bleak outlook, indeed now that Local 20055, Technical, Editorial and Office Assistants Union has called off its strike against Consumers Research, Inc., a strike that has been going on for four months. But the executive committee of Local 20055 announces that the fight will continue, that the 40-odd members will set up themselves as a rival organization, "The National Consumers Union," with Arthur Kallett and Dewey H. Palmer in charge. They will attempt to get the subscribers to Consumers Research, Inc., to cancel

their subscription to that organization and join the new group.

In the meantime the C. R. row has been up before the Warren County (N.J.) Joint Council of Labor Unions and the National Labor Relations Board for investigation. The trial examiner for N.L.R.B. has recommended reinstatement of the strikers and reimbursement of their lost wages, to which counsel for C. R. replies that they refuse to comply.

The future is fraught with possibilities.

Perishables vs. Non-Perishables

NOW that the national experiment of financing by processing taxes, payments to farmers to exercise self control, is ended, one bit of worthwhile information appears to have been gleaned at great expense. It is now fairly clear to everyone that there is a noticeable difference between the economics of perishables and non-perishables. But where the non-perishable is in competition with a perishable, the principle, well understood by most business men, that the perishable sets the price, forces the non-perishable far into the field of economic relationships of the perishables.

Thus it seems clear today that the producer must always pay the costs of a processing tax on a perishable, such as hogs. Where the product on which a processing tax is assessed is one that does not quickly spoil, it is possible to pass the tax along to a very considerable extent in the selling price.

Even though this seems to be the broad principle underlying the fairly recent behavior of commodity markets, the application of this principle to the field of actual business is not perfectly clear-cut. Many other factors tend to obscure the actual picture. There are some flour millers who doubt that they ever were able to recover in their selling prices all of the processing taxes paid to the government because of competitive conditions, even though their products were non-perishable.

Business is far too complex for most legislators to comprehend all its intricacies. Furthermore, most members of legislative bodies are rather simple men who are often suspicious of the motives of successful business men, and hesitate to accept their explanations of the complexity of business. Likewise there are also many academic economists who do not fully understand business.

It is to be hoped that this experiment in collecting processing taxes will be the last attempt ever made to finance government expenditures by such unsound methods.

Those Refunded Processing Taxes

EVERY manufacturer who receives or is due to receive refunds of processing taxes, floor stock taxes or other non-recurring income should consider carefully the disposition of this cash in case the government fails to recapture it. The times call for a long look ahead, particularly as long as some form of inflation is a serious possibility. Probably it will be credit inflation if it comes, but its effect on all prices will be much the same as it would be were it a currency inflation instead.

If prices are due for a rise, there will be no single group of commodities that will be chosen for the upping. It will hit everything unequally and indiscriminately, even new equipment.

Prudent manufacturers will realize that a very sound way to conserve their business will be by converting a substantial portion of the refunded money into low cost manufacturing equipment of the best quality obtainable. Machinery prices are probably at as low a point today as they will be for several years to come, and the usefulness of the best machinery is that it makes profits possible under all conditions.

How Much Should a President Know?

HOW much should the top executive know about running a factory? This perennial subject of debate has come up again recently, and the champions of various viewpoints have dusted off all the old answers.

Summarized, there are two general opinions. Those who have never worked in a plant, never operated a plant, have something of a disdainful

Hors d'Oeuvres

• Birth control has been blamed for a decline in the consumption of certified milk. 'Tis quite unconsiderate of the people. In fact, Liberty Leaguers probably would call it unpatriotic—or maybe even unconstitutional!

• *"Sunized Sausages" have been put on the market in Seattle. The ever increasing number of health foods makes one wonder how people managed to exist in the pre-vitamin, pre-laxative and pre-what-have-you era when food had no particular health value.*

• Dairymen, chain-stores, caterers. charity bazaars and private people in all parts of England are setting up milk bars, according to *Food Industries Weekly*, a British contemporary. Maybe American dairymen are missing a bet by not dispensing bovine juice at the curb.

• *"Man-Kind" dog food, so good "you can eat it yourself," is a new product out of the Northwest. A great deal of dog food has been sold to those who have no dog, nor even a cat, even without a suggestive label.*

• Manufacturers of dog food in three different flavors, John Morrell & Co., now comes forth with pet food in half-size cans for animals with refined appetites. Incidentally, sales of canned dog food increased almost 1,000 per cent last year.

• *If you are in the poultry-slaughtering business and come across a chicken with tatoo marks on it, don't think some drunken sailor has been playing tricks on you. Tatooing is the latest precaution taken by farmers against thievery.*

• Jersey lightning, commercially called applejack, may be sold by telegraph if tentative plans of Laird & Co. materialize. We suppose a typical wire would read: To Barney Blotto—One case of stucco.—Signed, Perry Polutto.

• *Brains are being packaged in transparent cellulose by Wm. Focke & Sons Packing Co., Dayton, Ohio. Wouldn't a lot of us be embarrassed if our brains were displayed in a transparent container.*

• American food companies that have adopted pneumatic-tired delivery wagons are not as far advanced as we thought. We have at hand a picture of a Belgian bread wagon which not only has automobile wheels, but fenders as well.

attitude. In their opinion the top man does not need to know anything about it. This group is the vast majority of top executives, and majorities are often wrong. Otherwise we would all be rich.

Then there is the much smaller group, consisting of men who are either production men today or who have served their time in that capacity and are now in executive positions. These men know that often it is a great hardship, not always good for the business, to work under a top executive who does not understand manufacturing. His decisions are often made on the basis of business expedience instead of an understanding analysis of all the facts. Sometimes his decisions are very lop-sided, with all the emphasis on the selling side rather than on an integrated understanding of the business as a whole.

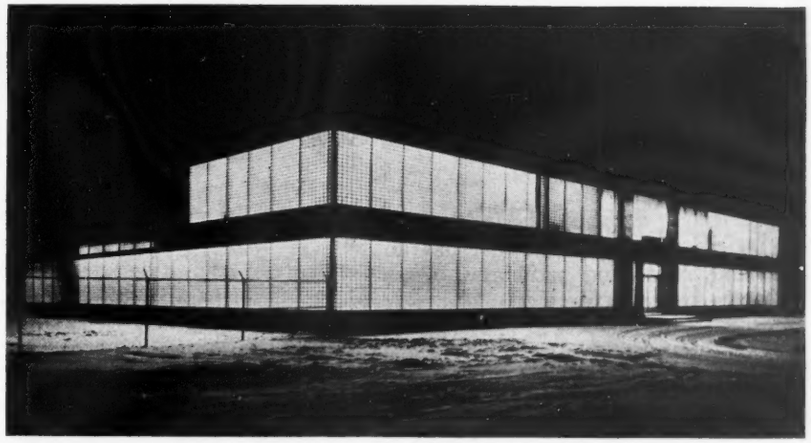
To our way of thinking it is as great a handicap for a top executive to understand only selling as it is to understand only production. The head of the works should be a man who knows a good deal of both.

Our preferred answer to the perennial question is that we believe the head of a company must know at least enough about production to recognize a good production man when he sees him.

A Statement of Policy

EDITORS and publications are frequently accused of partiality on certain important questions. Sometimes the accusation is true and the accused is proud of the position which he champions. For instance, FOOD INDUSTRIES has distinct leanings toward conservatism in business economics and national economics, and we don't care who knows it. On matters pertaining to relieving the problems of the producers of our industry's raw materials, FOOD INDUSTRIES is in favor of relief though disagreeing with the Administration on the method to be employed.

On certain controversial questions of purely industrial significance we often take no editorial stand. For example, our creed is that the best container for a product is the right one for that product under the expected conditions of service. The food manufacturer's primary interest is in the product itself, so that the consumer is best served, rather than in what kind of a container is used or who makes it. Furthermore, except when we get badly fooled, we feel compelled to refrain from publishing data and experience that may be facts yet at the same time may be misleading or only half truths even though the omission of the subject may appear to others that we are ignorant of it.



ALL GLASS—BUT NO WINDOWS

Research to solve packaging problems and to develop new applications for glass in the packaging industry will be conducted in this new laboratory of Owens-Illinois Glass Co., Toledo. The world's first all-glass, windowless building, the structure is built with 80,000 hollow blocks weighing 150 tons. The glass transmits plenty of light by day, and fresh air is supplied by an air-conditioning system. The building presents a striking scene at night.

War of the Containers

COMPETITION for business in the container field is assuming proportions undreamed of as recently as a year ago. First came the Sealcone paper container for liquids along in 1928-29. It had pretty tough going particularly after the late AAA attempted to regulate price differentials of milk at retail, especially in Philadelphia. In that battle it was first paper against glass and established milk dealers, and later it became a contest of paper against glass, milk dealers and AAA.

The next phase came when American Can Co. developed a new paper container for liquids. And a complicating force was the attitude of state milk control boards which ruled in various ways but generally to the effect that differentials must be limited, sometimes in favor of glass. New York ruled that unadvertised brands could sell at one cent a quart less than advertised brands. Borden Co. countered by incorporating a new company, unadvertised of course, and put out its milk in paper. New Jersey ruled that milk in glass and paper must sell at the same price regardless of store sale or house delivery. Massachusetts ruled that milk in paper must sell for one cent higher than bottled milk.

Then came the beer can. American, Continental and National Can companies all entered the brewery field with a can for beer. Owens-Illinois countered first with a non-returnable bottle, the stubby bottle; next, in December, 1935, they hired Fred A. Prahl from Continental Can. That Mr. Prahl, who had been in charge of Continental's production, was not engaged for the production of bottles was self-evident. Soon Owens-Illinois announced the purchase of Enterprise Can Co. and Tin Decorating Co. Rumor has it that Owens-Illinois has options on other independent can companies. But the important aspect of this battle is that Owens-Illinois is not going into beer can manufacture but into packers' cans and general line cans.

The next move was by American Can, which bought the Chicago can factory of Libby, McNeill & Libby. Then, in short order, Continental Can bought Armour & Co.'s can-making plant, also in Chicago.

And now Crown Cork & Seal Co., of Baltimore, is reported to have signed a contract to purchase all the stock of the Acme Can Co., of Philadelphia, and will probably make beer cans and general line cans. At this point a new type of metal plate is expected to come into the picture, the aluminum-coated plate.

Other significant moves are in sight, to be revealed in due time. But the important factor for those who are interested in the war of the containers is that the farmers' representatives come into the picture as a complicating force, where the con-

tainer is used for milk; whereas in the case of beer containers and packers' cans the contest for markets is only between the manufacturers.

Dirty Closures

NOT long ago one of the big bottlers of a beverage that has an enviable reputation nationally, began to have spoilage troubles. This was almost unprecedented in his business, because every plant operated was a stickler for clean bottles and sterile beverage. Hardy mold spores in the cork liners of the closure caps were finally proved to be the cause of the trouble.

It seems altogether evident that closing a clean bottle with an infected or a dirty closure is silly. But as long as men may forget that the closure must be sterile and clean, just as the bottle, it is well worth while to be reminded of the fact. Careful bottlers put their supply of caps in thoroughly dry closed storage containers or feed hoppers as soon as the shipping container is opened. Fresh shipments are very unlikely to be infected prior to opening of the shipping container if they are kept dry. On the other hand storage in a damp, mold-infected basement or warehouse or in open shipping containers is an open-arm invitation for infection by microscopic organisms.

Impregnation of the cork or other porous materials used in liners with hot paraffin is often the best remedy for such mold difficulties if they actually occur. But impregnation must be carried out at a temperature sufficiently high to get actual penetration of the paraffin into the smallest interstices. Mold spores are very resistant and, unless these minute plant bodies are reached and killed, they may occasion mold spoilage even from caps that are seemingly perfectly clean and in good order.

This is merely another case requiring proper biological control in the food processing plant.

Baking

ONE not directly concerned with baking problems but who studies them intensively is soon impressed with the outstanding characteristic of baking, that until the doughs or batters are in the oven, the bakery engineer is dealing with fleeting, transitory phenomena in the field of physical and biological chemistry and microbiology—phenomena of a most complex nature.

Furthermore, one will be impressed by the rapidity of these changes, the art and skill, which only experience can contribute, by which these changes must be modified and compensated if constant quality of product is to be maintained. To become aware of these rapid changes and their significance to bake shop practice, the bakery engineer—the production man—cannot wait for laboratory advice or it would come far too late. He must be able to recognize and interpret the quantity of change, and then act quickly.

In a sense, bake shop operations are comparable to the performance of an orchestra playing a well-known symphony on different occasions. The musicians and their instruments remain the same, the musical score is one from which they have played many a time, and yet successive renditions of the symphony are never absolutely alike, even though they may be ever satisfactory. Furthermore, two different orchestras play the same score and produce two different renditions, both good, both satisfactory, yet both different.

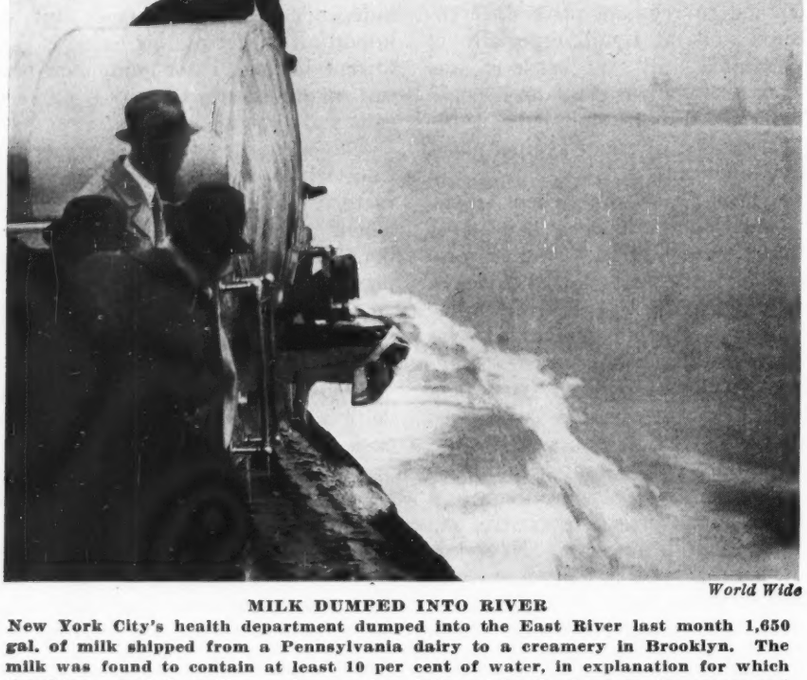
Probably in no other field of food manufacture does the production man face the problem of dealing with such rapid changes as those which take place in dough rooms. Yet he emplovs many familiar unit operations well known to production men in other lines. His first task is material handling, getting the flour from the storage room to the bag opening department. Then different flours must be blended and sifted, weighed, and mixed with other ingredients.

Although these operations are well standardized, skill is required in determining what to blend and how much, how much water to mix into the dough, what variations to make in conditions and in other ingredients in the effort to produce a uniform product. Not only should the bakery engineer be a good engineer, but he must also be a good craftsman.

Future of Door-to-Door Service

NEW possibilities in transportation are available to food manufacturers under the recent ruling of the Interstate Commerce Commission, which authorizes railroads to establish pick-up and delivery service for less than carload traffic. Allowances of 5 cents per hundred pounds are authorized to those who choose to do their own hauling to the freight station.

Initially only a few roads were involved in this case. But the pros-



World Wide

MILK DUMPED INTO RIVER

New York City's health department dumped into the East River last month 1,650 gal. of milk shipped from a Pennsylvania dairy to a creamery in Brooklyn. The milk was found to contain at least 10 per cent of water, in explanation for which the shipper said the milk was frozen when delivered by the farmers, the cream and butterfat sticking to the sides when the cans were emptied into the tank truck.

HALF A MILLION FOR RESEARCH

Erected at a cost of $500,000, the new seven-story Sunkist Building in Los Angeles houses a laboratory and a diet kitchen. The California Fruit Growers Exchange will use the laboratory for research work on oranges, lemons and grapefruit, the diet kitchen for originating and testing citrus-fruit recipes. Yes, the building will resist earthquakes.

pect is that every major transportation system is going to adopt door-to-door service, in a valiant effort to compete with trucks. This will wholly change the possibilities of transport, and introduce new chances for economy in certain cases.

Especially will it be important for food processors who own trucks themselves to find out whether they may not save the 5 cents per hundred pounds between shipping platform and freight station for their smaller shipments. These nickels may mount up handsomely in the course of a year, as a partial offset to other trucking costs. They may even make truck ownership more attractive than hired trucks. Re-study of local transporting problems is certainly in order for all.

Explosion Hazards

AN industrial hazard identified is more than half eliminated. Hence it is particularly interesting to the food manufacturer that a disastrous soybean explosion which occurred in the Glidden plant in Chicago last summer has been thoroughly investigated by competent government chemical engineers, and the cause clearly identified. Incidentally, the generosity of the Glidden Company in allowing full publication of the results of this investigation, deserves the commendation of all. That concern, which suffered seriously from a most unusual combination of circumstances, has acted generously in the hope that knowledge of the results of its misfortunes may provide a safeguard for others.

Dust explosions are widely recognized as of great possible danger in any plant which may produce a dust of any combustible material in the air. Hence most people jumped to the conclusion that the Glidden explosion was of this sort, since it is well known that soybean dust is of devastating violence when so exploded. The official report shows, however, that the real cause of the major damage was an explosion of the vapor of hexane, the solvent which was being used for extracting oil from the beans. A leak of this solvent had been detected somewhat before the explosion occurred, and it is now reported that workmen were actually engaged in hunting for this leak in advance of the disaster.

It is a good comedy crack on any stage to talk about looking for a gas leak with a lighted match. But it is no comedy crack when gas or inflammable vapor or dust is exploded anywhere. And it is at its worst when this happens on a large scale in an industrial plant, with the tremendous possibilities of danger to life and property.

Whenever solvent or gas leaks are suspected every other business becomes secondary to finding and stopping the leak. The only contemporary activity that can be justified is the extinguishing of flames, stopping of machinery, cutting off electric currents in such a fashion that there can be no fire or spark to ignite the vapor until its source is found and ventilation has again freed the atmosphere of dangerous concentrations.

Borden vs. N. Y. Milk Control Board

THE Borden Farm Products Co., Inc., lost its case before the U. S. Supreme Court in a decision handed down on Feb. 10. Borden had taken exception to the recent New York Milk Control Law which ordered a minimum retail price for milk, but permitted unadvertised brands to be sold for 1 cent per quart less than advertised brands. Borden wanted to sell at the lowest price permitted.

About all that this decision means is that, if New York or any other state wants to enact such a law, it is within its power. The court, of course, is concerned, not with wisdom, but with power.

Progress, Slow But Certain

IN the English language, the verb to blanch has a strange variety of meanings running from boiling, skinning and bleaching to covering with tin plate. To a peanut roaster blanching means to take the skin off the nut. To a canner it means to boil or treat with hot water. To a housewife, in some parts of the country, it means to drench with cold water.

In the suggested new blanching procedure presented elsewhere in this issue, Kohman and Sanborn of the Research Laboratories of the National Canners' Association, refer to blanching as a treatment with hot water.

Although canning as an art is well over a century old the discovery of what functions blanching actually performs is just beginning to emerge from obscurity. For many decades canners have been blanching without knowing exactly why. It is gratifying to observe the progress toward a more fundamental knowledge of a practice that long has been regarded as absolutely necessary but where science is only now catching up with the art. And as scientific understanding develops suggestions for new and probably better procedures begin to appear.

How Food Manufacturers Employ Advertising Agencies

By THOMAS MacGOWAN
President, Facts, Inc., New York, N. Y.

WHAT do American food advertisers think about their relationships with the advertising agency, the advertising medium and the public? More important still, what *are* these relationships?

And how do their attitudes and practices with regard to their dealings with these three factors in the advertising business differ from those of advertisers as a whole?

With a view to developing reliable data on the ideas and operations of advertisers in this country, we have been carrying on a comprehensive and extensive national survey. Our objectives have been to discover:

1. Advertisers' relationships with advertising agencies as to duration and continuity, compensation, selection and service, and their ideas on these points.
2. Advertisers' practices and ideas with regard to media promotional activities.
3. Advertisers' methods and ideas with regard to their relations with the public—chiefly as regards the ethics of their advertising.

Findings of this study as to the food industry and as to the differences between its advertising situation and that of industry in general will be reported in several articles in Food Industries. The survey has indicated that in some cases these differences are very marked.

In the food field we secured interviews with sales and advertising executives, presidents and vice-presidents of 44 advertisers, of whom fourteen were large (with advertising appropriations of more than $500,000 annually), fifteen were medium-sized (with appropriations of from $100,000 to $500,000), and fifteen were small (with appropriations of less than $100,000). Every branch of the food industry was represented. The survey as a whole embraced calls on 225 advertisers, of whom approximately one-third were in each of these size classes.

The character of the distribution—national, local or sectional—was roughly the same for food advertisers studied as for all the advertisers:

	National	Sectional	Local
Food advertisers	61.4%	34.1%	4.5%
All advertisers	76.0%	20.9%	3.1%

In this article we give the findings on the following questions:

How many advertising agencies do the average food advertiser and the average advertiser in general employ?

Why do food advertisers decide to split their accounts, and how do these reasons differ from those of other advertisers?

Through what agency relationships do food and other advertisers handle their radio appropriations? Do food advertisers use radio more frequently than others?

Does the average food manufacturer retain his agency contracts a longer time or

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Summary of Reasons Why Advertisers Changed to Present Agencies

Reasons	All Advertisers Number	All Advertisers Per Cent	Food Advertisers Number	Food Advertisers Per Cent
Wanted more service and attention	14	10.8	6	15.0
General dissatisfaction	13	10.0	4	10.0
Contact man changed agencies; we changed with him	12	9.2	5	12.5
Wanted new blood	11	8.5	2	5.0
Liked new plans proposed	11	8.5	2	5.0
Needed facilities of larger agency	7	5.4	2	5.0
Thought new agency more capable	6	4.6	2	5.0
Old agency went out of business	5	3.8	1	2.5
Incompatible with old agency	4	3.1	1	2.5
Friendship and politics	4	3.1	2	5.0
New agency had better knowledge of product, industry and problems	4	3.1	1	2.5
New agency had better merchandising service	4	3.1	..	....
Reputation and recommendations	3	2.3	1	2.5
Sought better attention from smaller agency	3	2.3	3	7.5
New agency produced better copy	3	2.3	..	....
Returned to original agency	3	2.3	..	....
Agency reorganization or consolidation	2	1.5	..	....
Exaggeration and lying by old agency	2	1.5	..	....
Poor sales results	2	1.5	2	5.0
Selected local agency	..	....	2	5.0
Other reasons	17	13.1	4	10.0
Total	130	100.0	40	100.0

Number and Duration of Agency Relationships

Number of Agencies Employed

		Use more than one	Use One	Use None	Total	Unclassified	Total
Food Advertisers	Number	9	29	4	42	2	44
	Per Cent	21.4	69.1	9.5	100.0	..	..
All Advertisers	Number	43	155	15	213	12	225
	Per Cent	20.2	72.8	7.0	100.0	..	..

Agencies Employed by Advertisers Who Have More Than One

		2	3	4	5	6	7	Total
Food Advertisers	Number	7	0	1	1	0	0	9
	Per Cent	77.8	0	11.1	11.1	0	0	100.0
All Advertisers	Number	31	6	2	3	0	1	43
	Per Cent	72.1	14.0	4.7	6.9	0	2.3	100.0

Number of Agencies Employed in Last Ten Years

		None	1	2	3	4	5	6	7	8	9	Total	No Response	Total
Food Advertisers	Number	1	6	11	11	6	0	1	0	0	0	36	8	44
	Per Cent	2.8	16.8	30.5	30.5	16.7	0	2.7	0	0	0	100.0	..	....
All Advertisers	Number	3	54	41	41	16	1	5	1	0	1	163	22	185
	Per Cent	1.8	33.1	25.2	25.2	9.8	.6	3.1	.6	0	.6	100.0	..	....

Ice Cream Hardened Faster, Cheaper, Easier

By ALBERT SMITH
Smith Sanitary Dairies, Doylestown, Pa.

Diffuser in holding room at Smith Sanitary Dairies. Used Instead of ammonia coils, this type of unit cut hardening time from twenty to six hours.

HARDENING time has been cut from twenty to six hours. Refrigerating costs have been appreciably reduced. Defrosting has been made much simpler and more sanitary. All these tremendously beneficial results, and more, have come to Smith Sanitary Dairies, Doylestown, Pa, as a result of replacing cooling coils with cold diffusers in two hardening rooms and one holding room.

An extensive system of direct-expansion ammonia coils formerly refrigerated the 12,000-gal. hardening rooms and the 24,000-gal. holding room. With this system, it not only took many hours to harden ice cream sufficiently for delivery, but it was a major plant operation when it came to removing the coating of frost on the ammonia pipes. Defrosting required so long and precipitated so much water on the floors that all the ice cream had to be transferred to another room and then moved back again after defrosting was finished. Much labor was involved; much time lost. The magnitude of this defrosting operation also indirectly introduced inefficiency into the refrigerating system. A too thick coating would collect on the coils while defrosting waited until it became imperative.

The old system was saddling the business with handicaps and needless expense in other ways, too. It was particularly inefficacious during the peak season when the high temperatures of summer provoked a peak thirst for ice cream in all forms and flavors. Rate of turnover in the hardening room was too low for high-demand production. Special rush orders could not be filled with dispatch.

Unnecessary expense attached itself to the power bill. The ammonia compressors worked long and hard, with the back-pressure gage indicating a 5-in. vacuum, to keep the suction temperature at —34 deg. F. and make up for inefficiency of the coils in absorbing heat. The machines, too, had to compensate for "warm" spots in the hardening rooms where stagnant air permitted non-uniformity in temperature.

But the plant isn't the same any more. The diffusers, with their air-circulating blowers, highly efficient cooling coils and quick-defrosting systems, have eliminated the trouble spots. The reduction in hardening time, is, of course, the most important improvement, but the high heat-transfer efficiency effected by moving air and well-designed coils is no less important. This lightens the load of the compressors by permitting them to work at the higher back pressure of 0 lb. per sq.in., a benefit mirrored in lower power costs. And being able to defrost hardening-room coils in 30 minutes to an hour, with absolutely no mess in the rooms and no need for moving the ice cream, looks extremely good to any ice cream manufacturer. The increased shelf capacity, created by replacing the wall-hung coils with a compact diffuser, likewise is put to remunerative use in the form of increased plant capacity. The shelves are used to permit free circulation of the cold air around the packages and cans.

The machine which made all these improvements may be seen in the illustration adorning this page. To be exact, there are two other machines, but they do not differ fundamentally from the one shown. This unit, made by Carrier Engineering Corp., comprises a metal cabinet which encloses direct-expansion ammonia coils whose small diameters and finned surfaces cause them to absorb heat quickly. A blower driven by a 1½-hp. motor brings air in from the floor and delivers it near the ceiling through a diffuser-type outlet.

TO make defrosting simple and sanitary, the diffuser connects to the outdoors with ducts which, when the regular inlet and outlet are closed, permit warm air to be circulated over the coils to melt the frost. A drain in the bottom of the cabinet, also connected with the outdoors, carries away drippings as the frost melts. In winter, when the outside air itself is tinged with frost, a steam hose is inserted in the defrosting-air inlet to supply the necessary heat. Within the brief period required for defrosting, the temperature does not rise more than eight degrees, so the ice cream need not be moved to another room to keep it from going soft.

It has been possible to get by with four or five defrostings a year in one hardening room because it is protected by airlocks against entry of warm, moist outside air. In the other hardening room, the coils need defrosting every week or so, but this occasions little difficulty. A draft gage indicates when defrosting becomes necessary, and the task is easy.

New Blanching Procedure For Peas*

By E. F. KOHMAN and N. H. SANBORN
Research Laboratories, National Canners Association, Washington, D. C.

THE blanching process for peas has been criticized on several scores. While no one would want to contend that it is without fault, it is not necessary here to review the points of criticism. It seems desirable, however, to point out some mistaken ideas as to what can be accomplished by the blanching process.

The bright green color with which peas emerge from the blancher tends to give some a mistaken idea. Some regard this as a fixing of the color in the peas. There is no truth in this. Hence, the idea that a more extended blanch will more definitely fix the color is without foundation.

Peas contain a thin outer skin or shell which is transparent. The space between this skin and the cotyledons and, to a lesser extent, the cotyledons, are impregnated with air, or more accurately, with air minus some of its oxygen that has been used by the pea. The normal life process of the pea requires oxygen for the respiration process and this air throughout the pea is a mechanism to supply the necessary oxygen. The important point to be observed in this connection, however, is that the impregnated air obscures the bright green color of the cotyledons. If the air is removed from raw peas by an adequate vacuum while the peas are held under water and, if the vacuum is then released, the porous layer between the skin and cotyledons, and also the cotyledons, either collapse or become impregnated with water. As a result, the cotyledons become bright green just as in blanching and this green is visible through the transparent skin just as is the case with blanched peas.

IT is evident therefore that the bright green color noticeable in blanched peas may be obtained without any hot water treatment—merely by subjecting the peas to an adequate vacuum under water and releasing the vacuum while the peas are still under water. Hence, from this standpoint alone, the present blanching process might be eliminated by the substitution of a vacuum process.

There is the feeling among some that the toughness or firmness of canned peas may be influenced by varying the blanch either as to time or temperature. Within reasonable limits of the blanch, this idea is fallacious. Probably three minutes and certainly five minutes at temperatures commonly employed in blanching peas will accomplish all in this respect that double this time will accomplish. It is possible to can peas without any blanch and obtain the same results with reference to tenderness as with a blanch, assuming a proper control of the rest of the canning process.

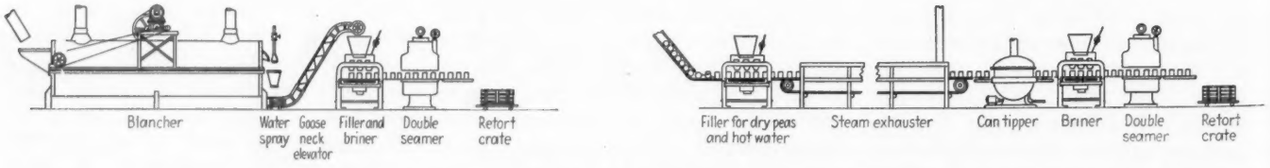
THE procedure to be described herewith has been arrived at after a careful study of what can be accomplished by a blanch and what can be accomplished by no other known procedure than the blanch. By blanch is meant a hot water treatment of the peas prior to canning. Such a treatment is indispensable to obtain the best flavor in canned peas. So far as is now known and is possible from a practical standpoint, there is no other procedure by which this improvement in flavor may be obtained than by a hot water treatment. The blanch removes certain constituents that otherwise impart an undesirable flavor. The new procedure to be described is therefore suggested on the basis of its efficiency in accomplishing this end.

Briefly the procedure is as follows. The peas are taken after the usual wash and grading for size that they receive in the factory. It should be emphasized that, at this point, all broken peas and free skins and other foreign particles, such as pebbles and thistle buds, should be removed because the handling beyond this point is such that no broken peas or loose skins will result. The first advantage of the suggested procedure may be cited here. It is far easier to remove efficiently broken peas, loose skins and foreign particles from peas while they are still raw than after they have been softened by the blanch. If all broken peas and loose skins have been removed there should result a can of peas devoid of them.

After being thoroughly cleaned, the peas are filled into the cans in which they are to be canned, and covered with either hot or cold water. The cans are then passed through an exhaust box which may be regulated to give the desired temperature and time and, in this manner, the amount of extraction may be controlled. Filling the cans with hot water instead of cold makes it possible to reduce the exhaust by approximately one minute.

(Turn to page 149)

*Abstracted from a paper presented before the annual convention, National Canners Association, Jan. 22, 1936, Chicago, Ill.



A food engineer's conception of how the new understanding of the principle involved in blanching might be put into practical operation. Left: The usual line-up as commonly used today. Right: A possible new line-up. N.B.: The can tipper shown is a quick acting device that has not yet been invented.

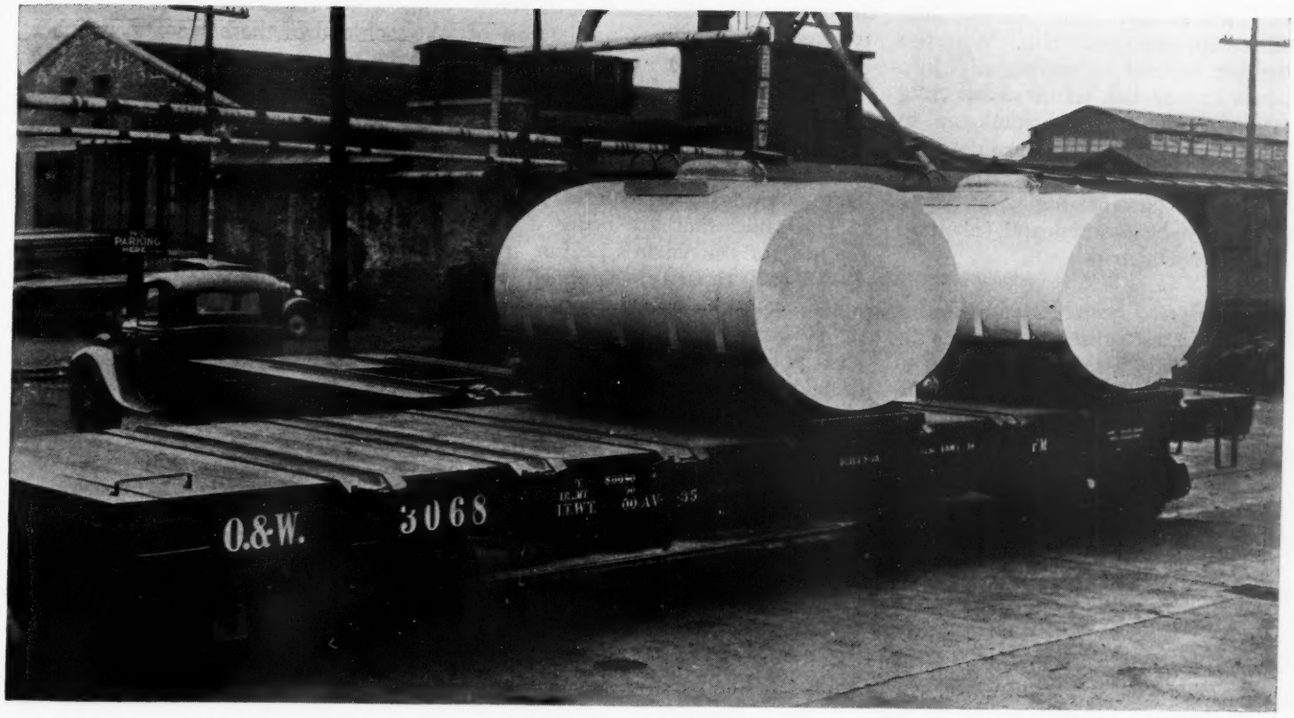


Fig. 1: Semi-trailer in place at flat-car, ready to move one of the two milk tanks from the car.

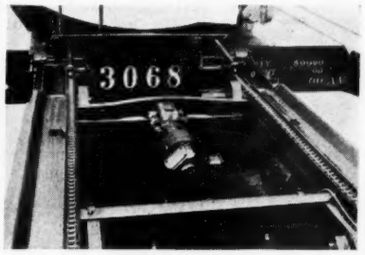


Fig. 2: Semi-trailer mechanism, showing conveying chains, motor gearing, shaft, and connection to flat-car.

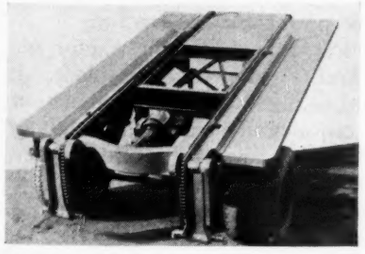


Fig. 3: Semi-trailer, with connection members used to form bridge to flat-car lowered to traveling position.

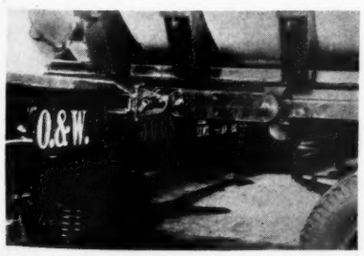


Fig. 4: Tank during transfer, showing bridge members in place between semi-trailer and flat-car.

New Rail-Truck Containers

Permit Rapid Transfer, Save Handling Costs

INTERCHANGEABLE containers, to facilitate the transfer of goods between railroad cars and trucks, are no new thing so far as general merchandise is concerned. The Cincinnati Motor Terminals Company has been using this system successfully for l.c.l. freight for a number of years and several railroads use it in restricted localities. However, the method has not been applied to any extent in the handling of liquid foods, which fact causes much interest to attach to new equipment for this purpose recently demonstrated in Weehawken, N. J., by Motor Terminals Company of 420 Lexington Ave., New York City.

The trial at Weehawken was in connection with a two-month test of the equipment, being carried out jointly by the N. Y. O. & W. R. R. and the Dairymen's League, for handling milk from country stations to the city pasteurizing plant. With the new equipment, the 2,000-gal. milk tanks, two of which are shown in position on a flat-car in Fig. 1, are filled with milk at the country collecting station. They are then transported by railroad to the city freight yard. Here each milk tank is transferred to a semi-trailer and pulled by tractor to the pasteurizing plant. There the milk can be unloaded into storage tanks, or the portable tank can be hoisted to an upper floor and the milk fed by gravity to the pasteurizing equipment.

If the latter method is used, considerable economy is realized in the matter of cleaning and sterilizing tanks. The tank, after emptying at the pasteurizing plant is cleaned, ster-

ilized and sealed. This cleaning then suffices for one round trip. With the alternate method of loading milk into a tank-car at the country collecting station, pumping from tank-car to tank-truck at the urban terminal, and pumping from tank-truck to storage tank at the pasteurizing plant, three tanks must be cleaned and sterilized for each round trip.

IT HAS also been determined that less time is required to transfer the tank from car to semi-trailer than to pump the milk from a car tank into a tank-truck. A similar saving in pumping is also made at the pasteurizing plant, if the milk is not transferred to storage tanks.

Economy in handling also arises from the use of this equipment when the handling is on a sufficiently large scale to permit the user to employ a number of tanks. It is then possible to haul full tanks from the railroad team track to the pasteurizing plant and carry empty tanks on the return trip. Also, the flat-car that transports the filled tanks from the country, returns the empty tanks for refilling. The saving is made through the fact that the tractor, semi-trailer equipment can be kept busy a greater number of hours per day than is possible with tank-truck equipment adequate to handle the same quantity of milk, and also because the railroad flat-cars are in constant use.

Finally, a saving is obtained in the cost of trucking because of the well-known economy of the tractor, semi-trailer, both in first cost and in operating expense. In the matter of first cost, this saving is particularly evident in milk handling. The cost of the new tanks, plus the cost of semi-trailers and tractors, plus the cost of equipping flat-cars to hold the tanks is very much less than that of the corresponding rail tank-car, tank-truck, milk storage tank and pump equipment adequate to handle the same quantity of milk per day.

The tanks that are being used in the test for Dairymen's League are of 2,000 gal. capacity, equipped with inner shells of "18-8" stainless steel of 10 gage thickness. Outside this shell is a 2½-in. layer of cork mastic. Outside this insulation is an outer shell of 12 gage copper bearing Armco iron. Each tank is attached by steel bands to a welded steel cradle that carries on its under side the device for locking the tank to the flat-car.

STANDARD flat-cars, depending upon their length, are equipped to carry four or five of these tanks. This is done by sinking into the upper surface of the car platform, at appropriate spacings, the special rails designed to hold the tanks, as can be seen in Fig. 1. These rails are of welded construction, made from steel plates, pressed to shape, and two of them are required to support one tank of the size shown. Between the rails and the car floor are thick rubber pads, serving as shock absorbers to cushion the load during transit.

In order to lock the tank to the rails on the flat-car floor each tank is equipped with four lugs, two locking into appropriately placed slots near the ends of each rail. These lugs are extended or retracted by a worm and ratchet arrangement, operated by a crank. Referring to Fig. 2, the holes into which the crank fits will be noted at each end of the horizontal member at the bottom of the tank-supporting cradle.

Just inside of each of the crank sockets in this member will be seen a rectangular opening. When the tank is locked to the rails, this opening is closed. When the tank has been unlocked, these openings are freed and the ends of the two chain-grippers hook into them. These chain-grippers have scissor-clamps on the other ends which attach to the chain, as shown in Fig. 2.

In order to form a bridge between the side of the flat-car and the semi-trailer, two swinging members, shown in Fig. 3, are attached to the rear of the semi-trailer. When the semi-trailer is not engaged to the flat-car, these members are carried in the position shown in Fig. 3. Fig. 4 shows the bridge members in place between the semi-trailer and flat-car, locked by a hooked bar passing through a hinged bracket on the flat car. In addition to forming a connection between the flat-car and the semi-trailer, these bridges serve to transmit all strain to the flat-car when the tank car is being moved, thus saving the tires of the semi-trailer from injury.

REFERRING again to Fig. 2, the motor, gearing and driveshaft which operate the chains, thereby moving the tank onto or off the trailer, can be seen. This unit also shows in Fig. 3. The power for the motor is supplied by a generator driven by the gasoline engine which also serves as motive power for the tractor.

In Fig. 5 is shown the tractor and semi-trailer, with a tank in place. It should be noted that this combination, in conjunction with the suitably altered flat-cars, can effect interchange of containers at any ordinary team track. Also, besides milk tanks, other containers can be used in the combination, such as tanks for other liquids, commodity freight bodies of 500 cu.ft. capacity, and merchandise freight bodies of 1,000 or 1,200 cu.ft. capacity. It is also possible to use a tank of greater capacity than 2,000 gal. by having it ride lengthwise of the freight car. When this is done, the chains for effecting the transfer run crosswise on the semi-trailer body, and the semi-trailer is spotted parallel to the flat-car when the transfer is made. In all these cases, the equipment is operable by one man, the tractor driver.

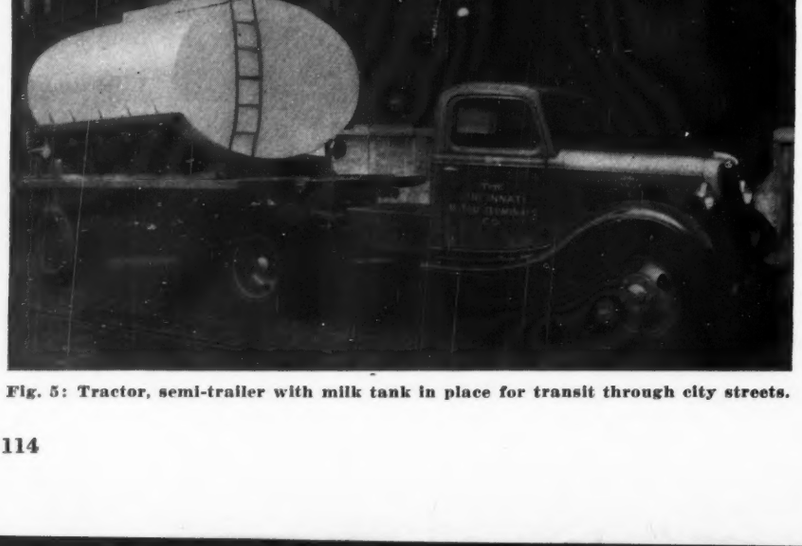


Fig. 5: Tractor, semi-trailer with milk tank in place for transit through city streets.

Molasses as a Food Flavor

In baking alone is used more than 60 per cent of the world output of the better grades of this industrial commodity as a source of flavor. Its coloring, sweetening, and moisture-retaining properties add to its economic importance. Confectioners and other food manufacturers also find it a popular as well as an economical flavor-imparting ingredient for their products.

By WILLIAM LOHR
Vice-President, American Molasses Co. of N. Y.
New York, N. Y.

MOLASSES is surprisingly different from other food products in that it has not been improved in quality with the adoption of modern processing methods. Like maple syrup and honey, its chief virtue does not lie in its sugar content or sweetening qualities, but in its characteristic flavor-imparting properties. Good molasses has the additional property of a rich, reddish yellow color which, like its flavor, is not lost when molasses is used as an ingredient in food mixtures.

Molasses can be classed either as a primary product or as a byproduct. It is derived from sugar cane or may be made directly from sugars of a certain type by special treatment to prevent crystallization. In terms of the definition proposed April 24, 1933, by the United States Food Standards Committee:

New Orleans Molasses, Table Molasses, is the product which remains after separating sugar from the clarified and concentrated juice of sugar cane. It contains not more than 25 per cent of water, not more than 6.5 per cent of ash; and not less than 62 per cent of total sugars (sucrose plus reducing sugars[a]).

Cooking Molasses is the product which remains after separating sugar from the clarified and concentrated juice of sugar cane. It contains not more than 25 per cent of water and not less than 58 per cent of total sugars (sucrose plus reducing sugars[a]).

Since the object of present-day sugar production is to obtain the greatest possible extraction of crystallizable sugar the advent of the vacuum pan and centrifugal machine in cane sugar production has lowered the quality in much of the molasses on the market today. Quite true, sugar has become one of the cheapest food products available in refined form, but at the expense of the delicious, natural cane flavor and mellowness of "old-fashioned" molasses, which so many of us are inclined to think of as a thing of the past.

IN THE "good old days" molasses was used both as a sweetener and for flavoring at the breakfast table, as well as in baking and cooking. Many of the popular dishes of New England containing molasses have since found their way into many parts of the world; in fact, today they are traditional.

Some of us still recall the time when every grocery store, whether it was in the country or in the large city, carried one or more barrels or hogsheads of molasses and the customer supplied his own jug to take home his purchase. Today molasses for home use is quite generally marketed in consumer packages—sanitary packer cans of Nos. 1½, 2½, 5 and 10 sizes. However, there are still many sections of the country, particularly in the states of Maine and the Carolinas where the grocer's stock is still carried in barrels and the traditional molasses jug gets its periodic refilling.

In the days of hogsheads and before the vacuum-pan and centrifugal era, the molasses pitcher was a daily companion to the sugar bowl and the salt shaker on the American family table. Today molasses enters the family dietary largely as an ingredient of cooked or prepared foods; particularly in baked goods and confectionery. Loss of flavor through present methods of sugar manufacture is largely responsible. In the face of all this, however, molasses of the "old-fashioned" quality is still available to those who take the trouble to select the molasses they buy rather than to accept what is offered them.

Loss of the natural cane flavor as well as the natural invert sugar content of other than the "open kettle" or the "first centrifugal" molasses is the result of repeated boiling of the molasses for sugar extraction in the centrifugal machine. The more delicate constituents of the molasses are burned to bitter caramel and the sugar extracted to the highest feasible degree by the whirling basket of the centrifugal machine separating the sugar crystals from the molasses.

Another factor affecting the quality of the molasses end-product is the character of the cane juice itself. The sugar cane grown in Louisiana contains fairly large percentages of invert sugar and impurities in proportion to the sucrose or crystallizable sugar. Consequently the "juice" requires careful clarification. This is accomplished by charging the fresh "juice" with sulphur dioxide fumes, and adding lime to reduce the acidity of the "juice." Liming is never car-

Table I: Edible Molasses Quality Factors

Grade	Total Sugar (per cent)	Ash (per cent)	Color
Open Kettle	68–70	1–2	reddish yellow
First Centrifugal	60–66	4–5	light yellow
Second Centrifugal	56–60	5–7	reddish
Third Centrifugal	52–55	9–12	dark brown

[a]Reducing sugars calculated as invert sugar.

ried to the point of neutralization, but usually stopped at a slight but distinct degree of acidity, which is maintained throughout the process of sugar boiling.

This procedure is followed to preserve the natural condition of the invert sugars present and, incidentally, the delicate cane flavor to a more or less extent. However, the character of the flavor largely depends upon the period of boiling. After boiling to the proper density, the "juice," or "massecuite," as it is now known, consisting of molasses and sugar, is passed through the centrifugal, where the molasses is spun out. This molasses is known as a first-centrifugal grade. The molasses which is left is either marketed as such—contingent on market conditions—or is subjected to another boiling for further sugar separation in the centrifugals. The molasses resulting from the second boiling is known as "second centrifugal," and, if a third boiling and centrifuging is carried on, the end product is a third-centrifugal grade of molasses.

The first two grades are in the edible class; usually the third-centrifugal grade is classed as final molasses or blackstrap. Blackstrap, as the inedible residue is generally known, is utilized in the manufacture of cattle feed, in the growing of yeast, and in the production of alcohol. Many millions of gallons of blackstrap are produced annually in the islands of Cuba and Java and our own Louisiana.

THE production of molasses classed as edible is carried on principally in Louisiana and the islands of the West Indies. Edible grades of molasses would be designated in the order of their quality as the Open Kettle or "Open-Kettle Style," First Molasses, Second Molasses, and, to, some extent, Third Molasses, where the latter is of a quality above that of blackstrap.

The finest grade of molasses—the open-kettle type—is that produced directly by evaporating the juice of the sugar cane without removing any of the sugar and without the use of sulphur or artificial preservatives. This is done by evaporating the "juice" of the sugar cane to the point where crystallization takes place and by draining the molasses from the sugar crystals. By this procedure the sugar content of the molasses is not exhausted and the molasses retains the natural flavor of the cane; quite

Molasses, Its Grades and Uses

	Open Kettle	First Centrifugal	Second Centrifugal	Third Centrifugal	Black Strap
Bakery Products					
Biscuits, Cookies	■	■	■	■	□
Breads	■	■	■	■	□
Cakes	■	■	■	■	□
Fillers	■	■	□	□	□
Icings	■	■	□	□	□
Macaroons	■	■	■	□	□
Marshmallow	■	■	□	□	□
Rolls	■	■	■	□	□
Beverages					
Rum	■	□	□	■	■
Confectionery					
Caramels	■	■	■	■	□
Fondants, Creams	■	■	□	□	□
Fudge	■	■	□	□	□
Gums, Jellies	■	■	■	□	□
Hard Candies	■	■	■	■	□
Licorice	□	□	■	■	■
Lozenges (pressed)	■	■	■	□	□
Marshmallows	■	■	□	□	□
Nougat	■	■	■	□	□
Desserts					
Pudding Powders	■	■	□	□	□
Fruit Products					
Preserves (spiced)	■	■	□	□	□
Meat Products					
Meat Curing	■	■	■	□	□
Mince Meat	■	■	□	□	□
Miscellaneous					
Alcohol	□	□	□	■	■
Animal Feeds	□	□	□	■	■
Beans (baked)	■	■	■	□	□
Caramel Color	□	□	□	□	■
Coffee Substitutes	□	□	■	■	■
Flavoring Extracts	□	□	■	■	□
Flours (prepared)	■	■	■	■	□
Soya Sauce	□	□	□	■	■
Vinegar	□	□	□	■	■
Yeast Growing	□	□	□	■	■
Syrups					
Cough Medicinal	■	■	■	■	□
Table Use	■	■	■	□	□
Non-Food Preparations					
Adhesives	□	□	□	■	■
Anti-Freeze	□	□	□	■	■
Chewing Tobacco		■	■	■	■
Foundries	□	□	□	■	■
Mortar	□	□	□	■	■
Printers' Rollers	□	□	■	■	■
Road Building	□	□	□	□	■
Sizing Materials	□	□	□	■	■
Smoking Tobacco	■	■	■	■	■
Tanning Preparations	□	□	□	■	■
Textiles	□	□	□	■	■

the reverse to that in which the "juice" is evaporated under vacuum and the centrifugal machine removes the maximum quantity of sugar from the molasses. Molasses made by the "old-fashioned" method is well recognized for its rich and mellow, rum-like flavor.

There are a number of factors which influence the quality of molasses. The principal one is its ash or mineral content. Another is the sugar content. Table I brings out the relative difference between the grades we have discussed. As a general rule, an analysis of molasses is of little value. The large blender or dealer determines the quality by the color, flavor and body. On the latter basis, there are almost as many varieties of quality in molasses as there are sugar mills producing it.

Selecting molasses for blending is an art rather than a science, and in reliable companies is done by individuals who, through many years of experience, are familiar with the character or grade of molasses produced by the individual mill. Special attention is given to blending of the grades to meet rigid standards of uniform color, flavor and body established for the baker, confectioner and other food manufacturers.

WHEN buying molasses particular attention should be paid to flavor. A poor flavor in the molasses ingredient will quickly depreciate the good quality of the other ingredients with which the molasses is used. This effect is particularly true in baked goods and confectionery.

Flavor in molasses may be evaluated upon its relation to: (1) Natural cane, (2) caramel, and (3) rum. Rum-like flavor is acquired by slow fermentation and ageing in wood, and is usually found only in high quality molasses. Caramelization which takes place in the production of high grade molasses is too slight to affect adversely its flavor and general qualities. However, in the lower grades, this caramelization is more pronounced and gives the molasses a burnt flavor which is very noticeable. It is the result of repeated boilings for the extraction of the highest yield of sugar possible.

Low grade molasses, like burnt sugar, may serve as a dark coloring agent, but the bitterness, which goes with burning, is not pleasing to the palate and, rightfully, has no place in food products where a pleasing flavor is important.

Causes and Prevention of
Soybean Plant Explosions

All that remained of the Glidden Company's plant in Chicago after the explosion of Oct. 7, 1935.

THIRTEEN MEN killed and 47 men injured was the toll taken by explosions in soybean processing plants in October, 1935. One of these disasters occurred in the Chicago plant of the Glidden Company, where, on Oct. 7, property valued at $600,000 was destroyed, eleven men were killed, and 45 were injured. The other explosion occurred on Oct. 22, at a small rural soya oil extraction plant at Momence, Ill., owned and operated by Varnum Parish, Jr., who, with his assistant, was killed in the blast. Two others were injured in this explosion.

Facts concerning these two events, the possible causes, and recommendations for preventing similar disasters are given in two articles in the January, 1936, number of the *Quarterly of the National Fire Protection Association,* by David J. Price and H. R. Brown, both of the Chemical Engineering Division, Bureau of Chemistry and Soils, U. S. Department of Agriculture. The information that follows is briefed from these articles.

The Glidden plant is situated in the city of Chicago, at 1845 North Laramie Ave. It produces soya oil, meal, protein and lecithin and has a capacity of 4,000 bu. of beans per day. The layout of the plant is shown in Fig. 1, in which the shaded area indicates the buildings that were destroyed.

PRIOR to the explosion, the whole plant had been closed down because of a shortage of beans. During this period the plant had been completely overhauled and cleaned. On the morning of Oct. 7, the new crop being available, operation recommenced with the regular employees in charge. After about three hours, the odor of gas was noticed and a foreman had set out to notify the manager when the explosion occurred.

Possible hazards present in this plant included the elevator, which has the same sort of dust hazard that is present in grain elevators. In the bean preparation building there was a dust hazard similar to that in a feed mill. The extraction unit was considered the most hazardous part of the plant, because of the presence of hexane. In the protein department there was another dust hazard, similar to that in a feed preparation plant, with the additional hazard of the oil-fired drier.

Apparently, the explosion centered in the upper part of the tank building, and was an explosion of gas. The manner in which the building walls were shattered and the absence of fire following the explosion indicate that the explosive mixture was gas and air in proportions conducive to the rapid passage of flame. This agrees with the report that gas was noticed before the explosion.

However, at variance with the con-

clusion is the fact that the only man who was burned in the explosion was stationed at the flaking rolls in the preparation building, and the evidence that the circuit breaker of the motor on one of the flaking rolls had opened four or five times during the morning. This man thought he might have been burned by a flash of flame from the motor, but that the big explosion came from the tank building next door.

THE conclusion reached by Messrs. Price and Brown was that gas from the extraction building passed into the top of the tank building in some way. As this building had little ventilation, a considerable accumulation of gas could have occurred. This may have been detonated by the flash at the flaking rolls. It is quite possible that the burns received by the man in the preparation building came from a mild dust explosion which, in turn, ignited the gas in the tank building. It is also possible that gas was also present in the bean preparation building.

In the explosion at Momence, the trouble occurred about six hours after the plant had commenced operation. This plant was built by Varnum Parish, Jr., a 1935 college graduate who was attempting to demonstrate the practicability of producing soya oil and meal in a rural location or on the farm. The building had formerly been a hatchery, and it was equipped with apparatus made locally. Fig. 2 shows a sketch of the installation, as nearly as could be determined after the explosion.

The investigation made it evident that hexane vapors were escaping and, being heavy, settled to the floor. When these vapors reached the firebox in the boiler room, ignition occurred.

In their articles on these explosions, Messrs. Price and Brown found certain precautions advisable, as follows:

A—For commercial soybean processing plants.

(1) In elevators handling soybeans, the safety code for the prevention of dust explosions in grain elevators as prepared by the Dust Explosion Hazards Committee of the National Fire Protection Association should be followed.

(2) In plants grinding or milling soybeans or preparing them for processing, the safety code prepared by the same committee for the prevention of dust explosions in flour and feed mills should be followed.

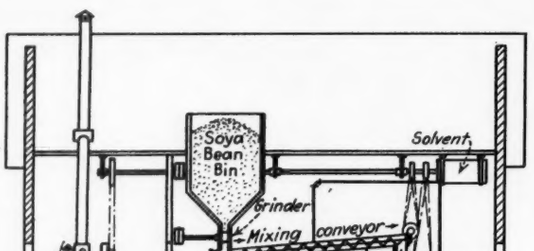


Fig. 2: Probable layout of equipment in rural soybean processing plant at Momence, Ill.

(3) Soybean elevators and buildings in which grinding, milling or other preparatory processes are performed should be segregated from other sections of the plant, and should have vents in the walls or roof to release explosion pressures without structural damage. Such vents, in the form of hinged sash or light panels, should have an area of 1 sq.ft. for each 80 cu.ft. of the building, room or bin.

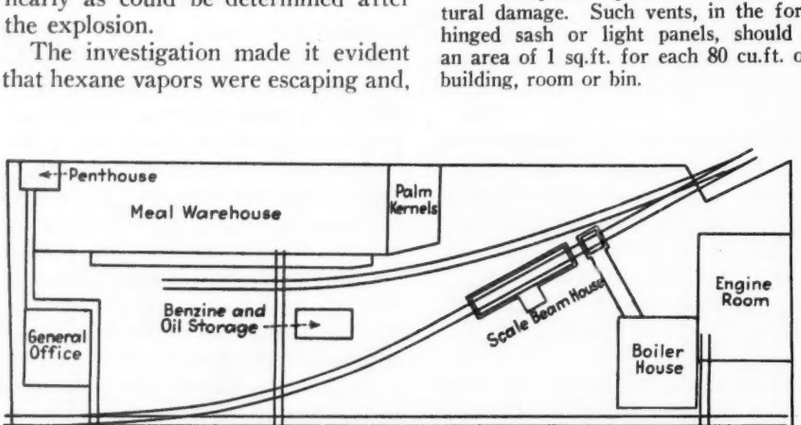


Fig. 1: Plan of the Gildden Company soybean processing plant in Chicago, showing area that was destroyed.

(4) The same precautions suggested for soybean milling or preparation units should be adopted in plants preparing protein from soybeans, particularly in the drying section.

(5) Dryers in all parts of a plant where inflammable dust is present should be separated from other sections of the plant, and the outside walls should be equipped with the above recommended amount of venting facilities.

(6) Dust collectors should be installed outside or vented outside of the building.

(7) To guard against any inherent dust explosion hazard, special attention should be given to the type of drier used.

(8) In soybean processing plants using the extraction process all possible precautions should be taken to provide for the safe operation of such units because the solvents generally employed constitute a fire and explosion hazard.

(9) Where hazardous solvents are used consideration should be given to the practicability of installing instruments which will detect the presence of inflammable vapors and give warning when the concentration approaches the lower explosive limits.

(10) Attention should be given to the development of a non-inflammable solvent for use in such processes.

B—For rural community unit installations.

The investigation of the explosion has developed the following recommendations which it is believed will be helpful in the further development of plants for soybean utilization.

(1) Safety measures should be developed for explosion prevention in farm and rural community installations of this character.

(2) Attention should be directed to the possibility of developing a non-inflammable solvent for soybean extraction units for farm and rural community use.

(3) If non-inflammable solvents are not practical and efficient for operating reasons, the use of inflammable solvents must be surrounded with effective practical safety measures.

(4) In any rural community installations involving inflammable solvents, provision should be made for underground storage of the solvents outside of building walls.

(5) All electrical apparatus and equipment should be of the approved type, installed in accordance with requirements of the National Electrical Code.

(6) Provision should be made for ventilation in units of this kind, so that any escaping gases or vapors can be carried outside the building.

(7) The boiler room and any other sources of open flames should be safely separated from the main extraction unit.

(8) The building in which the extraction unit is installed should be so constructed as to provide adequate venting area to relieve any pressures from explosions or fires.

(9) Provision should be made by local authorities for adequate inspection of units of this kind before operations are undertaken.

Britain as a Market for Tomato Products

By H. B. CRONSHAW
London, England

RECENT prohibition of imports from Italy into Britain has given rise to a new set of circumstances which is quite naturally regarded with considerable interest by American manufacturers of tomato products, for Italy's share of the total imports of these products into the United Kingdom amounts to about 35 per cent, whereas that of the United States is barely 1 per cent.

The Italian production of fresh tomatoes has fallen off in recent years from the high level of 1929, when it was 1,298,000 tons to 834,000 tons in 1934. Only a small proportion of these fresh tomatoes is exported (34,400 tons in 1934), chiefly to Germany, the exports to the United Kingdom being negligible.

Between 40 and 50 per cent of the output of fresh tomatoes is used in the manufacture of tomato products, embracing tomato pulp (or puree), paste, and canned tomatoes, generally peeled. Most of this output is exported. It is estimated that only 25-35 per cent of the total production, mainly in the form of highly concentrated puree, is used for domestic consumption.

The Italian export position over the six-year period, 1929-1934, is summarized in Table I. The latest figures available at the time of writing which define the present position are given in Tables II and III. These tables are taken from reports prepared by the Intelligence Board of the Imperial Economic Committee.

Now let us turn our attention to the British regulations relating to the labeling of tomato products and also to those governing requirements of quality, etc. Before doing so it should, however, be mentioned that canned tomatoes, and tomato products generally, are subject to an import duty of 10 per cent *ad valorem*.

Labeling Requirements—These are embraced by the Merchandise Marks Act of 1926, the Food & Drugs Act of 1928, and the Preservative Regulations of 1925-1927. As regards the first, the part relevant to goods manufactured in foreign countries for importation to the United Kingdom is the general requirement that such goods must bear an indication of their origin, either in the form of the word "Foreign" or a definite indication of the actual country in which the goods were manufactured or produced—e.g. "Made in U. S. A.," "Canned in U. S. A.," "Produced in U. S. A.," or simply the name and location of the manufacturer. These words must be conspicuous and in close proximity to the marks which they are intended to qualify.

The other requirements, which relate to purity, come within the scope of the general legislation covering all articles of food sold in the United Kingdom as laid down in the Food and Drugs Act of 1928. These requirements are, however, not defined in any precise and clear-cut manner. Considerable latitude is allowed provided that there is no evidence of any attempt to depart from the one fundamental principle that the label correctly describes the product.

Thus, as a general statement of the position, the Act makes it an offence if any person wilfully gives, with an article which he sells, a label which falsely describes the article. Usually a retailer would plead ignorance under this clause, so that the onus is driven back to the manufacturer of seeing that his labels do correctly describe his product. Decisions in cases of dispute as to what is correct labeling are usually left to the courts.

Added or Injurious Substances—Equally broad and lacking in precise definition are the requirements relating to the presence of substances which have been accidentally incorporated during manufacture or which have been added for the purpose of increasing the bulk or weight or of concealing inferior quality.

The former is, of course, largely a question of metallic contamination and regarding this there is no definite legislation apart from the general principle that substances must not be present in foodstuffs in quantities which are likely to be injurious to health. It is, however, generally understood that the maximum limits for metallic contamination are: arsenic, 1/100 grain per lb.; tin, 2 grains per lb.; while lead should be absent and copper not more than a few parts per million.

The second consideration is again one of correct labeling. It is an offence to add substances for the purpose of increasing the bulk or weight, or of concealing inferior quality, unless it is distinctly stated on the label that such an admixture has been made.

Preservatives—The use of preservatives is governed by the Public Health (Preservatives, etc., in Food) Regulations of 1925 to 1927. Tomato sauces and catsups come under the heading of "Pickles and sauces made from fruit and/or vegetables," in which an amount of benzoic acid (or the equivalent of sodium benzoate) up to 250 parts per million is allowed.

Such sauces containing preservative must bear a label on which is printed a declaration to the effect that "This sauce contains preservative." In most cases, however, no preservative is used, and the label bears some inscription such as "Free from all artificial preservative and coloring matter."

Tomato pulp does not usually contain preservative and is not mentioned in the Preservative Regulations. The nearest approach is "Fruit and fruit pulp not otherwise specified in this schedule," which is allowed to contain up to 250 parts per million of sulphur dioxide.

On the other hand, the consistency of the various pulps imported varies and the

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Don't Muff This Opportunity

A LARGE number of inquiries coming to FOOD INDUSTRIES from various places in Southern Europe, especially the Balkan countries, clearly show that many European manufacturers are eager to begin to manufacture tomato products for the British market. The impetus for the move is, of course, the loss of that market by the Italian manufacturers because of British action pursuant to the Covenant of the League of Nations. As long as Italy tries to conquer Ethiopia it is to be expected that Britain will be compelled to purchase its tomato products from sources other than Italy.

Herein lies a splendid opportunity for American food manufacturers, especially those near the seaboard. But, l t it be remembered, that the varieties of the tomato commonly used in the United States have a flavor and physical characteristics that are slightly different from the Italian pear tomato to which the British have been accustomed.

If American manufacturers, in trying to cultivate the new market, will sell only their best quality and steadfastly refuse to allow any but the best products to be exported there is a considerable possibility of opening up a new outlet that may prove to be permanent.—Editor.

solid contents are usually notified because higher prices can be obtained for those of higher solid contents. Grades at present on the United Kingdom market run 18 to 20, 28 to 30, and 38 per cent solids, the last mentioned being very close to what is known as tomato paste, which is usually Italian in origin.

Colors—Coloring matter is not added to imported pulp, but is sometimes used in sauces. This question of colors is covered by the second part of the Preservative Regulations and applies to foodstuffs in general. Briefly, coloring matters which are not permitted to be added to articles of food are (a) compounds of antimony, arsenic, cadmium, chromium, copper, mercury, lead and zinc; (b) gamboge, and (c) carbazotic acid (7), dinitrocresol (8), naphthol yellow (9), Imperial Yellow (12), yellow coralline (724) (the numbers referring to the color index of the Society of Dyers and Colorists, 1924). No declaration that a color has been added is required on the label.

Thus all colors which are allowed in the United States are permitted in Britain, and, as a general statement, the American pure food laws cover the requirements of the British regulations.

Tomato Puree—As far as I know there are no special regulations for canned tomato puree other than those of the Preservatives Act and of the Merchandise Marks Act. Some public analysts have, however, been taking action recently where tomato puree has been found to contain copper and the following is an extract from the Annual Report of the Chief Medical Officer of Health for 1934.

"It appears that tomato puree commonly contains copper in amounts varying from 15 to 40 or more parts per million, due to the fact that the puree is prepared in copper evaporating plant. Copper vessels have, of course, been widely used in food manufacture, but it has usually been found that the amount of copper thus introduced into foods is not more than one or two parts per million, figures of the same order as those for the copper naturally occurring in certain vegetables and fruit. Tomatoes themselves may naturally contain small quantities of copper, up to as much as five parts per million. Tomato puree is widely used in food canning and in the production of sauces, and it is somewhat disquieting to find that practically all of it is contaminated with copper to an extent not far short of what was formerly considered necessary for the greening of vegetables. It is hoped that the action already taken at the ports of entry will stimulate manufacturers to alter their methods. Obviously it is impossible at short notice to condemn all tomato puree containing copper, but consignments showing an excessive amount should be condemned, and as time elapses and opportunity is offered for the manufacturers to improve their plant and methods, the requirements of Local and Port Sanitary Authorities in this country should be made progressively more stringent."

There are no special labeling regulations in this country relating to puree, and the sizes of cans in which puree is imported are generally the 5-Kilo and the American No. 10. It is, however, advisable to state either on the label or by a stamp on the end of the can what the soluble solid content of the puree is, as various concentrations from 12-30 per cent solids are imported at present.

Finally, there are two points which should be carefully borne in mind by American manufacturers of tomato products intended for the United Kingdom market. The first is that tomato pulp from the continent of Europe usually arrives here in cases containing ten 5-Kilo tins, usually lacquered. The second point relates to flavor. It is sometimes said that the American product falls short of the Italian or Hungarian product in respect to flavor. It is difficult to say to what extent this opinion is held, but it is obviously one which demands serious consideration.

Table 1: Exports of Canned Peeled Tomatoes and Tomato Conserve from Italy, 1929-34

Destination	1929	1930	1931	1932	1933	Average 1929–33	1934
	Tons	Tons	Tons	Tons	Tons	Tons	Tons
United States	74,550	25,510	36,170	34,780	33,070	40,810	36,330
United Kingdom	27,800	18,580	24,110	20,950	18,110	21,910	19,130
Argentina	8,630	9,780	3,420	2,700	1,470	5,200	20
France	5,600	4,270	2,700	1,850	1,880	3,260	1,190
Belgium	3,670	3,100	2,580	2,650	3,680	3,140	2,820
Germany	2,350	1,480	1,560	1,970	1,830	1,840	2,720
Other Countries	13,120	10,660	8,570	8,390	8,270	9,800	9,290
Total	135,720	73,380	79,110	73,290	68,310	85,960	71,500
Proportion of canned peeled tomatoes in total	67%	48%	61%	65%	65%	62%	66%

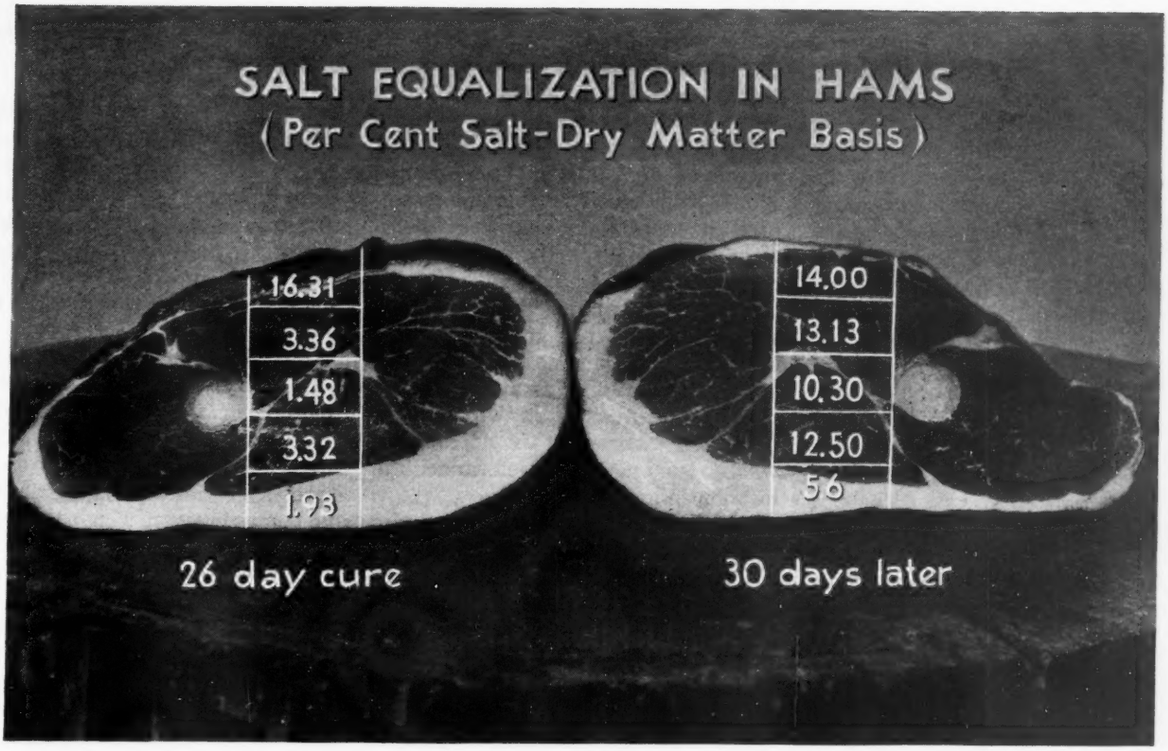
Table II: Arrivals of Canned Tomatoes and Tomato Products at the Principal United Kingdom Ports in the Five Weeks Ended 30th November, 1935

Classification	Canada	Channel Islands	Germany	Italy	Spain	United States	Other Countries	Total
	Cases	Cases	Cases	Cases	Cases	Cases	Cases	Cases
Canned	64,250	.....	.....	203,765	19,242	1	200	287,458
Puree and Pulp	38,684	1,795	16,159	9,586	7,171	100	1,770	75,265
Paste	.....	.....	.....	457	.....	....	....	457
Juice	14,632	.....	.....	100	.....	148	1,125	16,005
Catsup and Sauce	74,323	700	.....	6,554	.....	1,250	.....	82,827
Soups	105,830	6	.....	50	.....	.....	.....	105,886
Conserves and Preserves*	.....	.....	.....	10,775	56,291	4,400	3,143	74,609
Five weeks ended Nov. 30, 1935	297,719	2,501	16,159	231,287	82,704	5,899	6,238	642,507
Five weeks ended Oct. 26, 1935	435,381	1,295	3,670	109,300	153,535	2,595	4,044	709,820
Five weeks ended Dec. 1, 1934	254,674	530	3,812	104,698	49,015	4,193	28,930	445,852

Table III: Arrivals of Canned Tomatoes and Tomato Products at the Principal United Kingdom Ports in the Four Weeks Ended 28th December, 1935

Classification	Canada	Channel Islands	Germany	Italy	Spain	United States	Other Countries	Total
	Cases	Cases	Cases	Cases	Cases	Cases	Cases	Cases
Canned	14,187	800	.....	33,266	9,434	500	50	58,237
Puree and Pulp	3,668	.....	3,928	68	801	109	1,275	9,849
Paste	.....	.....	.....	.....	.....	....	....	.....
Juice	2,980	.....	.....	.....	.....	1,072	130	4,182
Catsup and Sauce	86,451	.....	.....	900	.....	1,600	....	88,951
Soups	13,920	.....	.....	.....	.....	25	....	13,945
Conserves and Preserves*	.....	.....	.....	2,318	20,204	2,000	2,934	27,456
Four weeks ended Dec. 28, 1935	121,206	800	3,928	36,552	30,439	5,306	4,389	202,620
Four weeks ended Nov. 30, 1935	208,093	2,095	14,514	184,050	43,426	3,887	5,438	461,503
Four weeks ended Dec. 29, 1934	55,404	1,835	1,616	57,790	51,225	4,265	542	172,677

*Probably includes items appropriate to other headings.



The rectangles shown on these hams by white lines indicate where the test pieces were cut.

How Aging Affects the Distribution of
Salt in Cured Hams

By R. C. MILLER and P. T. ZIEGLER
The Pennsylvania State College, State College, Pa.

THE time element is an important factor in securing a uniform distribution of curing materials used in cured hams. It is true that preservation of the meat by preventing or reducing the action of microorganisms is the principal object of the process of curing ham. However, in addition to this function, the curing agent contributes to the final quality of the meat as manifested by its color, flavor, tenderness, and saltiness. This is not to say that curing alone can produce a high quality product from inferior pork, but rather to emphasize that a poor quality can result from faulty curing methods applied to good quality pork. It goes without saying that a ham containing enough salt to preserve it well, may not be acceptable from the standpoint of palatability if the salt is not distributed uniformly throughout the piece.

The requirements with respect to salt in cured ham are: (1) that the amount present be sufficient to exert the required preserving action in all parts of the ham; (2) that the amount present should not be in large excess so that the ham would be said to be oversalted; (3) that the salt be uniformly distributed throughout the meat.

IN an investigation of the latter point, the idea in mind was that, with other things being equal, such as the curing temperature and the amount of curing agent that is applied or allotted to the meat, the completeness of the distribution of the salt is definitely related to the time elapsing after the beginning of the cure.

In carrying out some experiments concerning this point hams weighing from 14 to 19 lb. were cured. At some time during the cure each ham was sampled for salt analysis by taking a center cut across it next to the aitchbone, the cut being about one inch thick, three inches wide and as long as the ham was thick. This cut was divided into five equal horizontal sections which were separately analyzed for salt. Thus the salt content was determined on samples representing the center of the ham as well as the two adjacent sections, and the two outside sections, one from each side of the ham as shown in the photograph above.

The average salt content of the center cut was computed from the salt contents of the individual pieces. The standard deviation of the salt

content was also computed. From the mean and the standard deviation, the coefficient of variability of the salt content was computed, this value being a numerical expression which denotes the extent of variation in the salt content of the various sections analyzed.* Thus it expresses the extent of equalization or distribution of the salt between the five sub-samples.

This means of expressing the extent of the distribution of salt has been found to be very useful for comparative purposes. Thus if the salt contents of all five sub-samples of the center cut are approximately the same, a low co-efficient of variability of the order of from 5 to 20 will be obtained. If there is an excess of salt in any one or two of the sub-samples, as is often found, particularly in the outside portions of the ham, the coefficient of variability will be high, probably being between 50 and 150.

The analysis of the center cut samples of three first quality commercial hams are given in Table I, the percentage of salt given being that present in the dry matter. It is seen that the lowest coefficient of variability is that for ham No. 3, where there is the least difference in salt content between the various sub-samples. It should be explained that sub-sample No. 1, being mostly fat, is not always used in the computation of the coefficient of variability. The salt in these three hams would be judged to be fairly well distributed throughout the meat, although it is most uniformly distributed in ham No. 3. Inasmuch as no information was available concerning the manner in which these hams were cured, it is not known what factors may have determined the distribution of salt in them.

In Table II are given some results obtained with hams cured by the authors. It is recognized that most of these hams were subjected to cure for very short periods and admittedly were not well cured, but they are presented here for purposes of illustration. None of these hams were smoked.

The results show how at the end of 14 days in cure the salt is relatively concentrated in the outer portion of the ham. Gradually some of this salt penetrates to the inner portion where its concentration is increased. A numerical picture of this phenomena is given by the coefficients of variability which decrease in value as the salt becomes equalized.

THESE facts are further illustrated by the results given in Tables III and IV. Pairs of hams from the same hog were put down in cure at the same time, one analyzed upon their removal from cure and the other held for 30 days before being analyzed, during which time it was smoked.

The results given in Tables III and IV show that if given time enough, the salt in a ham will become well equalized throughout the various portions. With hams cured from 26 to 42 days an additional aging of 30 days gave a product in which the salt was well distributed.

Further, removal of the ham from the cure proper, soaking it, and smoking do not stop the process of salt equalization, but rather it continues even through the process of smoking and subsequent aging. Smoking may possibly hasten salt equalization due to the exposure of the meat to a higher temperature. Experimental hams cured differently from those cited above had coefficients of variability of 5 per cent or less after combined curing and aging periods of from 120-130 days.

Apparently, from all of the results obtained so far, the method of curing has little influence on the salt equalization during the subsequent aging period. Dry salting and brine methods differ in fundamental details, however. In dry curing the salt is all applied to the meat within a short time after the starting of the cure, and thereafter the process is simply one of equalization and distribution of the salt throughout the meat. In brine curing, salt is being taken up from the brine continuously until the meat is removed from it, and not until this time does absorption of salt cease and salt equalization continue by itself. In either case additional aging after removal from the cure helps to produce a product uniform in salt content.

*The coefficient of variability is a measure of the dispersion of data as related to the average. It is expressed as the percentage of the mean which is represented by the standard deviation. Thus:

$$C.V. = \frac{\text{Std. Dev.}}{\text{mean}} \times 100$$

Table I: Per Cent of Salt Distribution in Commercial Hams

	Ham Number		
	1	2	3
Sample No. 1, skin side	8.7	2.9	6.6
Sample No. 2	11.1	11.4	16.5
Sample No. 3, center	11.2	7.5	12.9
Sample No. 4	15.4	13.7	18.1
Sample No. 5, outside	18.1	13.9	15.5
Mean salt content	12.9	9.8	13.9
Coefficient of variability of salt	24.6	25.8	16.1

Table II

Method of cure	Number of days in cure	Coefficient of variability of salt	Salt in center, sub-sample (per cent)	Salt in outside, sub-sample (per cent)
Dry-cured, packed in salt	14	117.5	0.6	2.5
Dry-cured, packed in salt	20	136.9	1.4	27.7
Brine-cured, 90° pickle	14	124.1	1.0	20.3
Brine-cured, 90° pickle	20	113.8	2.1	26.4
Brine-cured, 70° pickle	14	157.4	0.8	21.6
Brine-cured, 70° pickle	20	134.3	1.4	24.7
Brine-cured, 70° pickle	28	101.3	1.4	13.8
Brine-cured, 70° pickle	35	65.3	2.8	13.4
Brine-cured, 70° pickle	42	54.6	3.8	13.6

Table III: Dry-Cured Hams

(Curing mixture = 8 lb. salt, 3 lb. brown sugar, 3 oz. saltpeter)

Number of days in cure	Number of days held	Coefficient of variability of salt	Salt in center, sub-sample (per cent)	Salt in outside, sub-sample (per cent)
26	..	111.9	1.5	16.3
26	30	12.7	10.3	14.0
28	..	120.8	2.5	13.3
28	30	15.9	8.8	11.9
35	..	70.7	3.1	12.3
35	30	12.2	9.0	10.8
40	..	59.8	3.7	13.5
40	30	8.4	9.7	11.8
42	..	48.7	6.0	15.7
42	30	11.0	10.7	9.7

Table IV: Brine-Cured Hams

(Curing mixture = 8 lb. salt, 3 lb. brown sugar, 3 oz. saltpeter in 4 gal. water, used for 100 lb. meat).

Number of days in cure	Number of days held	Coefficient of variability of salt	Salt in center sub-sample (per cent)	Salt in outside sub-sample (per cent)
28	..	83.8	2.1	13.6
28	30	3.2	9.3	9.9
34	..	80.5	3.1	16.8
34	30	33.2	7.0	11.8
35	..	90.9	2.9	18.9
35	30	17.8	10.6	7.5
42	..	73.6	3.2	16.3
42	60	6.4	12.2	10.6

Processing the Peanut

The salted-peanut roaster must avoid, not merely overcome, the conditions which promote the development of rancidity.

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U. S. Department of Agriculture Photo

Use of oil for too many batches is likely to ruin eating quality of peanuts no matter with what care they are selected and prepared for roasting. Kettles should be emptied, thoroughly cleaned and refilled with fresh oil after every twelve to fifteen batches.

RANCIDITY, arch-enemy of the roasted, toasted or deep-fried peanut, taxes the ingenuity of the processor and puts him on his toes in the matter of close process control and effective "housekeeping." Selection of right operations and use of well-designed equipment are highly helpful.

The manufacturer gathers his supply of raw stock peanuts during the fall shelling season and stores them in large quantities in burlap bags. Some prefer paper-lined bags. Immediately his troubles begin, because rodents and meal moths will infest the nuts unless precautions are taken. Excess moisture and freezing, too, must be guarded against. Sterilization of peanuts in the shell is best effected by the use of ethylene oxide, an odorless, non-toxic, highly penetrating fumigant which does not impair quality or flavor. The nuts should be fumigated several times during the season. Only shelled nuts are carried in storage for long periods.

The best method of fumigation is to place the nuts in a sealed chamber and employ either a slight pressure or a vacuum to obtain penetration of the mass by ethylene oxide.

THE first step in the actual processing of the nuts involves shelling. A screw conveyor raises the unshelled stock from the storage bin to a shell splitter, which consists of a cam-operated hammer with a broad, smooth face adjusted to give a breaking, not a crushing, force on the individual pod. The pod or shell is split along the median line joining the halves of the shell. The split shells are wafted away to a storage bin by a strong draft of air from a fan placed below the splitter. The meats fall through an aperture too small to admit the shells.

Gravity carries the shelled nuts to a series of violently vibrating sieves, where graduated openings remove foreign material and classify the nuts as to size. The No. 1 and No. 2 nuts are generally bagged for storage and fumigated, except for the quantities which are required for the current daily supply.

When the shelled nuts start on their final trip through the plant, they are first hand-dumped into hoppers above the picking tables. No automatic process exists at present for picking and selecting the nuts. However, practically no fault can be found with the hand-picking system. It is not expensive; it is efficient.

A 12-in., or wider, conveyor belt moves slowly down the center of a picking table, the sides of the belt being flush with the table top. A cam-operated door on bottom of the supply hopper discharges the peanuts from the hopper into the belt in a definite quantity at regular intervals. The plant superintendent adjusts the cam speed to synchronize the feed with the speed at which the pickers can function effectively.

To contribute further to careful picking, bunching on the conveyor is avoided by a distributing device. This comprises a series of regularly spaced wires which "rake" the belt; they are supported by a metal bar. Since the space between wires is just sufficient to pass a single nut, the device spreads the bunches over the entire width of the belt. Each peanut may then be inspected easily and with accuracy and dispatch. The pickers are seated intermittently along the table; no two are directly opposite each other.

BLANCHING—skinning—the nuts is the next operation. This operation the processor borrows from the coffee industry. He uses a coffee roaster in which to steam the nuts from 20 to 60 minutes, depending upon the variety. A revolving drum in the roaster keeps the nuts in constant motion, while the steam moistens the thin, red, paper-like skin, and effects a mild coagulation or shrinking of the meats to loosen the skins. At the same time it heats the nut to drive off water vapor and expand the air between skin and nut meat.

When at the stage where the skin peels off easily, the nuts pass to the blanching unit. Resembling a large airtight box, this unit is lined with a series of brushes. The yet-warm peanuts are dropped by chute and permitted to fall through the brushes which remove the skins. As the peanuts fall downward between these brushes they meet an upward current of fan-driven air which prevents too rapid passage of the peanuts through the brushes and serves to separate the loose skins from the nut meats. The skins are blown through an outlet at the top of the blancher unit and into a chute on the end of which is hung a collecting bag. They are saved for animal-feed by-product use. Cushioning the fall of the nut meats by this current of air also prevents their being broken into halves or splits as they drop to the bottom of the unit and are collected in a bag or drum.

Having been blanched, the peanuts now go through a final inspection over a second picking table, at the end of which they pass over a magnetic separator to remove any particles of metal. The use of the separator, incidentally, is strongly recommended, as nails, slivers of steel and bits of

tramp iron may give rise to expensive damage suits.

Now ready for the cooking kettle, the nuts are conveyed to upper-floor wooden supply reservoirs by air blast, screw conveyor or light-weight drums. Here the enterprising manufacturer puts in his first lick at rancidity control and makes a bid for higher quality. This he does by predrying the nuts with a reservoir temperature of 70-80 deg. C. while awaiting discharge from the cylindrical reservoirs into the roasters. This pre-heating gives a nut which not only roasts better, but which will not become rancid as quickly.

Variously called, toasting, roasting and deep-frying, the cooking process in reality is the latter. Technically, the operation involves partial dehydration and consequent partial coagulation, with an interchange absorption of a small percentage of coconut oil and loss of small quantities of peanut oil.

Control of the process is most important, and certain conditions must be established before the operation starts. First of all, the coconut oil must be sweet, with a free-fatty-acid content of not more than 0.5 per cent. It should be perfectly clear or filtered if not clear. Its specific gravity should not exceed 0.926 at 15 deg. C.; the moisture content should be ascertained as this factor has a greater influence on the development of rancidity than does the fatty-acid content of fresh, highly refined oil. Whatever is the condition of the oil at time of cooking will be that of the final product. It should be as near moisture-free as is possible to get.

The kettle, which usually is of iron, sometimes aluminum or glass-lined, should have a concave bottom with a bottom outlet through which muck and burnt stray nuts can be removed between roasts.

It should be thoroughly steamed and dried before being charged with oil. When ready, it is conveniently filled from an overhead supply tank through a pipe and valve connection built on a swinging axis. A "full" mark on the kettle further speeds the work and gives more accurate level control.

ALL metals are not suitable for oil-handling equipment. When bronze and similar alloys are used in valves and connections, the nuts acquire a bitter, metallic, almost nauseating taste. This taste can be removed from the oil by refining, but the nuts are irretrievably ruined. Iron valves and piping are good, while heat and acid-resisting glass ones would be ideal. Joints and connections must be free from "pockets," and the system must be so designed that each day it can easily be flushed with a sodium hydroxide solution, washed with water, sterilized with steam, dried with heated air from cooling-tray blowers and flushed with new oil. Flushing out with sodium hydroxide (industrial-alkali) solution is highly important. The lye saponifies the free-fatty-acid content of the oil to form readily soluble soaps which are removed by the water and steam.

Attention to slight details in cooking are to the prevention of rancidity what pasteurization is to milk. Temperature fluctuations are detrimental, and the manufacturer who has insulated jacketed kettles possesses an important advantage. Not only does insulation save time and gas in bringing the oil to cooking temperature in the morning, it also reduces the time during which the oil remains below cooking temperature after it has been chilled by each fresh batch of nuts. A series of test runs has showed that peanuts for which the pre-heating time was greatest because of lack of insulation, developed rancidity slightly more than 20 per cent earlier than those for which there was a shorter time lag.

Automatic temperature control on the cooking kettles is a practical money-saver. Without this, the operator may scorch a batch while regulating the burners. A few batches saved more than pay for the temperature regulating unit. A temperature recorder also is desirable. With temperature records and control reports on the condition of oil from each batch, the plant manager has a good working picture of the condition of each cook. Any slight irregularity will be noticed, so that a bad batch can be traced and usually prevented from reaching the market.

While every manufacturer has his own ratio of oil to peanuts, an exemplary batch can be taken. First, 300 gal. of tested coconut oil is drawn into the kettle and heated to about 300 deg. F., when preheated nuts are used; somewhat higher temperatures may be needed if unheated nuts are used. Then 125 lb. of nuts in an open-mesh wire basket is lowered into the oil. Accompanying a drop in temperature the oil foams as the nuts heat up with the driving off of residual moisture and air. The drop in temperature should not go below 275 deg. F. During the cooking period the temperature will gradually rise again to approximately 300 deg. F., depending upon the variety and condition of the nuts. A cooking range of 275-325 deg. F. should be regarded as limiting extremes.

The operator stirs the nuts periodically with a resin-free wood paddle during the ten-twelve minutes of cooking and "pulls" them when they have taken on a rich cream color.

To prevent delay during which the hot oil would continue the browning process, the basket is lifted from the kettle with a hoist, let drain about two minutes, and transferred quickly to cooling trays with perforated bottoms. The nuts will continue to brown after being spread out in the perforated trays until the operator turns on a blast of cold air which blows up through the perforations and into a duct system. If the batch has been pulled too soon, the operator waits until the nuts reach a golden brown before turning on the fan.

SALTING, the next step, is fraught with danger. Many manufacturers spoil their batches at this point. Salt at best is very hydroscopic. It adsorbs a great deal of moisture and holds it intimately in contact with the oily nuts to promote rancidity in the finished product. This factor is so important as to behoove every manufacturer to obtain salt which adsorbs a minimum amount of water. Some salt manufacturers have a special salt for roasted peanuts.

The operator throws 2 pt. of salt over the 125-lb. cooled batch and works it into the mass with his paddle. To prevent the salt from falling off the nuts and collecting in the bag, later to be dumped into the hand of the consumer, the nuts are given an oil coat to "seal in" the salt without making the nut excessively oily. This is accomplished by revolving each batch in a drum at about 50 r.p.m. after spraying on a quart of fresh coconut oil. The excess oil and salt thrown off by the revolving drum leaves the nuts in a comparatively dry condition.

THE peanuts having been properly processed, their keeping quality now depends to a large extent upon the package. The best material found so far for peanut bags is glassing. To begin with, it is inexpensive. It also gives good display to its con-

tents and can be closed to retard ready access of air and moisture vapor to the nuts. While this protection and display advantage in comparison with other materials used in bags is slight, it appears to be sufficient to meet most conditions. The finished peanuts ship best in corrugated paper cartons wrapped in paper and given an exterior coating of wax.

To the successful peanut processor, condition of the coconut oil used in cooking is extremely important as a matter of delaying development of rancidity. Over-using oil is inadvisable. After about twelve to fifteen batches, between which fresh oil has been added to make-up for the 6 lb. lost on each 125-lb. batch, the muck is removed, the spent oil is withdrawn, and the kettle refilled with fresh, tested oil. Time for changing oil is easily determined with accuracy in a plant having a control chemist. During each cook, he takes samples and authorizes a change when allowable percentages are exceeded in moisture content (2 per cent), muck, free fatty acids (1½ per cent), specific gravity and peanut oil content (2-4 per cent). Spent oil has a definite market value as soapstock and muck as a constituent for cattle feed.

A really efficient peanut plant recovers spent oil by refining it. The recovered oil more than pays for the operation. Many methods are employed, of which the following is an example:

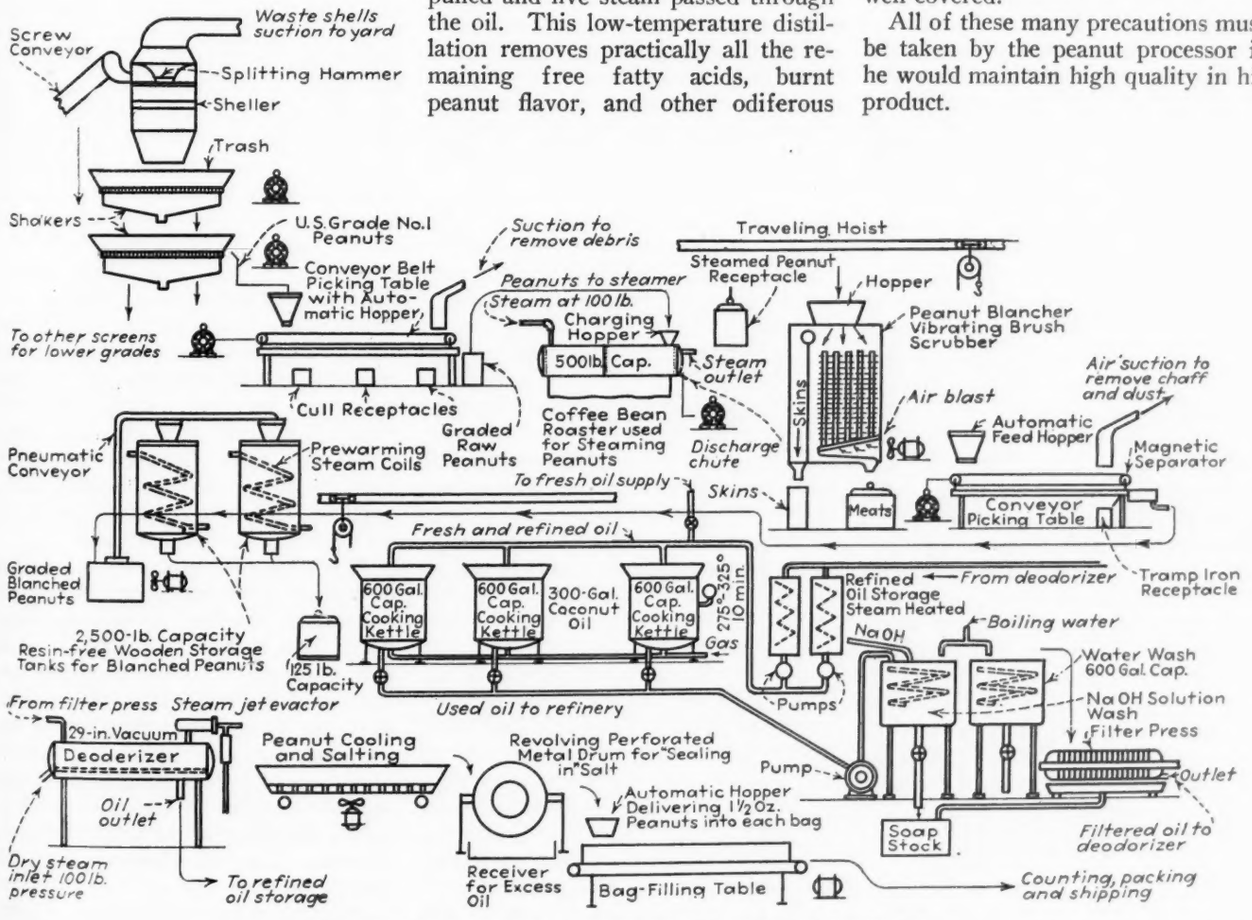
Spent oil is run through a filter press while warm to remove the suspended muck. The oil is then put into an iron tank, mixed with filter aid, filtered again, and boiled with a 1 to 2 per cent caustic solution. Then it is washed with water, thoroughly dried by evaporation and re-filtered. The saponified free fatty acid layers are recovered and put into drums for sale to soap companies. This soapstock brings only a cent or two less than the fresh oil.

While many plants use the oil after these treatments, it will pay every processor to deodorize it. This may be done in a large, airtight, cylindrical tank equipped with perforated steam coils. With the oil in the tank, a vacuum, preferably of 28 in., is pulled and live steam passed through the oil. This low-temperature distillation removes practically all the remaining free fatty acids, burnt peanut flavor, and other odiferous elements making the oil quite pure with less than 0.5 per cent free-fatty-acid content.

EVERY precaution against rancidity pays dividends. One which must be insisted upon is plant cleanliness. Superficial cleaning will not do. Rancidity is caused by enzymes as well as by oxygen, light, and other factors. Consequently, the lipase—fat-splitting enzymes—must be destroyed. Floors, tables, and other stationary articles should be washed with a strong alkaline detergent and well rinsed. Kettles should be washed down, flushed and scrubbed if necessary. Pipe lines and fittings ought to be flushed with an alkaline solution, rinsed with water, sterilized, and dried.

Sterilizing is best accomplished with live steam at 100-lb. pressure. Floors, ceilings, walls, tables, kettles, conveyors, and what not ought to be steamed thoroughly. Then the equipment should be covered with a clean, steam-sterilized canvas for the night. All particles of food, oil or other substance should be placed in tight containers, raised off the floor, and kept well covered.

All of these many precautions must be taken by the peanut processor if he would maintain high quality in his product.



Diagrammatic flow chart of operations and equipment involved in preparation of salted peanuts and refining of used cooking oil.

Malting Is More Than the Sprouting of Barley

Part One

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Results of recent researches indicate that malting activates dormant carbohydrate-splitting enzymes and stimulates, in the sprouting grain, the production of enzyme-activating substances; also, that the enzyme content can be increased during drying. These observations are important not only to maltsters and brewers but also to producers of malt extracts, diastatic flours and enzyme concentrates. It is well to bear in mind that the work covered in this article was done largely on German two-row barley. American barley is the six-row variety. Varietal differences in the barley should be taken into account in interpreting the results obtained in the studies made.—EDITOR.

ONE of the principal goals of malting technology is to obtain the highest concentration of enzymes in the barley grain during the malting process in order that the insoluble food material deposited in the grain during ripening may be subsequently obtained in soluble form in the extract by the mashing process.

Efforts to this end are complicated by the economically important problem of obtaining the requisite enzyme concentration with the minimum of respiration loss. The practical maltster determines the success of his malting procedure empirically by observing the degree of solution of the grain material. The analytical chemist, in place of this frequently deceptive empirical observation, is able to obtain a reliable estimate of the degree of solution by a differentiation of the organic nitrogen of the malt or a determination of several enzymic activities, which provide at once the necessary estimate of value at the time of observation. Only a more comprehensive insight into the chemical nature of malt will eventually justify an estimate as to its apparent suitability for the intended purpose and for the commercial mashing process.

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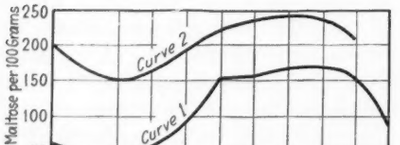

Fig. 1: Development of Sugar-Forming Activity During Malting Expressed in Grams of Maltose per 100 Grams of Dry Barley Malt.

Curve 1 gives the value of the normal extract. Curve 2 that of an extract after digestion of the same sample with 1 per cent papain for 23 hours at 26 deg. C. It is obvious that by digestion with papain a considerable amount of amylase is liberated. The difference diminishes with continued germination and finally[10] disappears after ten to fourteen days germination.

This discussion will be confined to an exposition of the development of the most important enzyme activities during the malting process. First we shall take up the carbohydrates, the carbohydrate-splitting enzymes, of which amylase has been most extensively studied and which demands primary consideration both from a qualitative and quantitative standpoint. The relatively simple and apparently obvious relationships offered by earlier investigators appear to be much more complicated today because recent researches have provided more comprehensive insight into the nature of amylase and methods have been found to measure quantitatively its separate functions. The following functions[1] of amylase may be distinguished: (*a*) To saccharogen amylase, the enzyme component of the unsprouted grain, is due substantially the sugar forming activity of amylase. By R. Kuhn's[2] nomenclature it is a beta amylase, and is characterized by its sensitivity to temperatures above 60 deg. C., and by its stability to acidity of pH 3.3. (*b*) Dextrinogen-amylase, an alpha amylase, is a typical component of germinated barley. It becomes strongly active after three to four days malting and is characterized by its great sensitiveness to acid and its remarkable stability to temperatures above 60 deg. C. It quickly breaks down the large starch molecule into many smaller aggregates[3] and in this manner it creates many points of attack for the saccharogen-amylase. Whether the liquefying power of amylase is an independent enzyme or is associated with the two components is an open question. From theoretical considerations it is concluded[4] that the presence of any particular starch liquefying enzyme need not be assumed but that liquefaction of the starch is a direct result of the breaking of glucosidic linkages by alpha and beta amylase. Many observations[5] [6] indicate that while a close connection exists between the liquefying factor and the dextrinogen-amylase, the two enzymic functions do not seem to be identical.

A further problem pertinent to the discussion is the nature of the development of amylase during germination. The earlier investigators held that a synthesis of the enzymes occurred during the course of germination[7] but today we incline to the belief that sprouting induces in part a liberation of pre-existing but inactive amylase present in the grain and in part a development of activating substances. Of significance for the change in our concepts are the research studies on the liberation of amylase by digestion with papain, [8] [9] [10] [11]

on amylase activator, [12] [13] and finally on amylose in the granule,[5] believed to be accompanied by specific inhibitory substances (sisto-amylase) for which there are specific antibodies (elueto-amylase). Authors of research studies[14] also believe that they have found a typical kinase for dextinization in trypsin preparations. Since protein degradation products play a significant part in the liberation of amylolytic activity as well as for its activation, it may be assumed[13] that the appearance of the amylase function is dependent upon previous strongly active development of proteolysis.

Since the theory may appear to be incomplete and contradictory let us consider a quantitative observation of the phenomenon of the development of amylase during germination which will illustrate the results in a simple and comprehensive manner. (Figs. 1 and 3).

Again the amount of amylase in malt is of technological importance. In general it can be ascertained that small grained, high protein barleys give a higher diastatic activity, under identical malting conditions than large grained, low protein barleys. The distillers, for whom the malt is essentially only a source of diastase, make good use of this fact in that they employ the light barleys which are not considered useful in brewing. Moreover it has been established that a cool malting always produces a higher diastatic activity than a warmer one. Finally it has been shown[17] that the length of the malting has a considerable influence. While the liquefying power continually increases during germination up to 25 days and then remains constant, the saccharifying power reaches its maximum in 20 to 23 days and then slowly diminishes. Lastly the physiological relationships of each crop year play a considerable role[18]. Many crop years are abnormal. The malt lacks in diastatic activity and causes trouble with saccharification in the mash house. In a number of such cases the principal cause has been shown[19] to be a deficiency in the formation of liquefying activity in the normal saccharification.

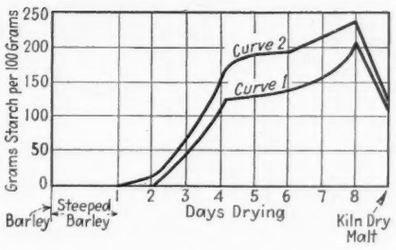

Fig. 2: Development of Liquefying Activity of the Same Malt Expressed in Grams of Starch per gram of Dry Malt[15] (with and without papain digestion).

Even though this Lintner-Sollied-Doesel[15] method may not be highly sensitive the enormous increase of the liquefying power during three to four days germination is obvious and is so extraordinary that one can hardly refrain from the impression that an actual enzyme synthesis occurs.

With regard to the influence of drying, I may refer to the fact that the diminution in enzyme content, always observed upon drying, is controlled by the temperature, time, and water content of the malt, and consequently can become quite important in the case of dark malts of the Munchener type, but is often inconsiderable in the case of the bright Pilsner type.

(c) Remaining carbohydrate-splitting enzymes may be considered very briefly because of their small practical importance and further because our knowledge regarding them is insufficient. The alpha-glucosidase which splits maltose into two molecules of glucose has repeatedly been shown to be present in malt and barley[20] [21]. Other investigators[22] followed the development of the enzyme during malting and found (Fig. 4) it to double in concentration from barley to green malt while in the withered malt just before kilning the increase was three times the original. In this case the final drying also caused a considerable decrease. It can thus be concluded that in commercial starch degradation small amounts of glucose are formed along with maltose by the maltase.

Likewise research studies[23] [24] give proof of the presence of beta-glucosidase, because cellobiose was split by addition of malt extract. Also extracts[25] of green and dry malt split amygdalin and salicin, which is fur-

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ther evidence for the presence of beta-glucosidase activity.

(d) Lastly among the simple carbohydrates the existence of beta-n-fructosidase (invertase) in barley and malt has been shown [26] [27] as is to be expected; sucrose is an important constituent of malt. However, it is surprising that there are no observations concerning the change in invertase from barley to malt.

Our knowledge regarding the existence in malt of those enzymes which hydrolyze the higher polysaccharides is even more scanty and incomplete, particularly those which attack the tissue and cell wall constituents and which are concerned with the solution of the endosperm. A great deal of contradiction and uncertainty exists in this field due for the most part to the fact that we still know so little about the particular chemical structure of the cell walls. What we observe in a single case is for the most part a vaguely defined portion of the process comprising "Cytolysis."

Attack on the natural cellulose of the barley during germination does not appear probable.[22] [28] Cellulose, not natural to the grain, and its degradation products, however, appear to be susceptible to splitting by malt extract.[24] Moreover lichenin, a reserve food, is split by addition of malt producing cellobiose.[29] [30] Also development of lichenase during germination has been studied[31] and an increase in the enzyme content of about 50 per cent after eight to eleven days growth of the barley was found.

Mannans, polysaccharides of mannose, are split by the addition of

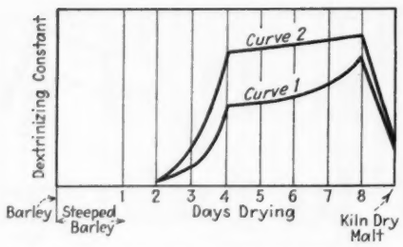


Fig. 3: Development of Dextrinizing Activity of the Same Malt Determined according to the Reaction Velocity Method.[16]

Dextrinizing Activity curve is so similar to that of the liquefying activity that one feels justified in assuming a close connection between the two functions. Proof that they are still not identical was shown by[6] destroying alternately the sacchro- and dextrinogen-amylase[1] and then determining quantitatively the single functions. It was thus found that the liquefying power lost at most 10 per cent of its activity under the influence of temperature; the dextrinizing activity fell to 65 per cent of its original value. Moreover, although the two enzyme functions react similarly to higher acidity and inactivation by ultra violet light there are important quantitive differences.

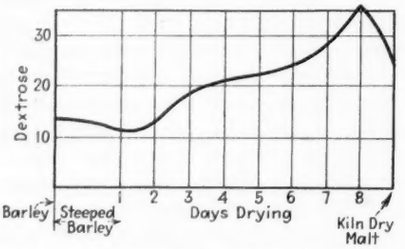


Fig. 4: Development of Maltase Activity In Green and Wilted Malt

Concentration of *a* glucosidase in barley is doubled in green malt and is tripled in wilted malt[22]. Further drying in the kiln results in a marked decrease.

malt,[32] [33]. In addition an enzymic hydrolysis of salep-mannan by malt extract was reported.[23]

The pentosan—or hemicellulose-splitting enzymes are by far the most difficult to evaluate since here the lack of our knowledge regarding the constitution of these chemical individuals in addition to the inadequacy of the analytical methods present singular difficulties. But cytolysis surely plays a decisive rôle in this group of carbohydrates which contribute to the structure of the cell wall. Simple and exactly defined substrates are obtainable only in the natural condition. Thus a splitting of zylan to xylose was obtained[34] by the addition of malt. The xylan was prepared from straw.[35] It has been shown[22] that during germination an extraordinary increase (about five times) in soluble pentosans occurred as determined by the method of Kroeber-Tollens.[38] Since polygalacturonic acids and polyglucuronic acids also form furfural on distillation with hydrochloric acid, some[7] surmise that we are here concerned with only a chemical pentosan degradation. Even if on the basis of this newer knowledge the extraordinary increase in soluble pentosans is not proved, the conclusion must still finally be drawn that one of the constituents of the cell membrane is subject to hydrolysis during germination. Lastly the presence in malt of enzymes which split pectinous material has been demonstrated.[39] [40] [41] The barley gum, galaktoxylan, first prepared by Lintner[42] has been definitley shown to be subject to enzymic splitting by Luers and Fries in a still unpublished work. In view of the great importance of cytolysis it is to be hoped that intensive work will soon result in greater clarification.

Odor and Taste from Wood

Forest Products Laboratory rates hardwoods as to suitability for food containers.

IN FOOD INDUSTRIES, December, 1935, a table appeared on page 611, giving data concerning certain common woods used by food processors. One of the properties given in this table related to taste imparted to water by these materials. Since that time, additional information as to both taste and odor imparted by wood to foods, has been released by the Forest Products Laboratory, U. S. Forest Service, Department of Agriculture, Madison, Wis. A summary of this information follows:

Butter, more susceptible to taints than any other food product, when used as the test medium by a dairy expert, disclosed that several Southern hardwoods, in addition to the favorites, ash and yellow poplar, are suitable for food containers from the taste and odor standpoint. Taking ash, the best wood for containers, as 100, the woods rank as follows:

Ash	100	Yellow Poplar	71
Maple, soft	84	Elm, soft	68
Hackberry	83	Gum, black	64
Sycamore	80	Cottonwood	58
Beech	73	Gum, red	58
		Magnolia	55

Other properties than odor and taste must be considered when selecting a wood for food containers. However, any pronounced tendency to impart odor or taste is in itself sufficient to bar a wood from use for certain of the more taint-susceptible food products.

Controlling Packaging Supplies

How six food companies solve the problem of having on hand the right amounts of the right packaging supplies at the right time.

NO PHASE of factory management or operation is handled in as many different ways as the control of the supply of packaging materials. Every plant has its own peculiar method of handling this very important item of management routine. Each system also tries to avoid having on hand any unnecessarily large inventory of packaging materials.

Not many years ago it was commonplace for concerns to run out of supplies at inopportune times, usually some trivial item such as a neckband for a bottled product. Sometimes the missing item of supplies was one of such moment that all the manufacturing operations were held up.

Anyone who considers the matter of proper control of packaging supplies, and gives it adequate study, soon faces the fact that somewhere along the line, somebody has to do some pretty good guessing (or forecasting) of probable needs. Occasionally one hears, "Oh, yes, we keep a perpetual inventory and that gives us all the data we need. As soon as the stock reaches the order point the stock clerk sends through a ticket and the purchasing department handles it as a routine matter."

Such a simple method of handling is seemingly possible only when a single line of goods in one size of package is manufactured and when the business consists of putting together a few ingredients, processing and packaging them. Just as soon as the business of the food company departs from this elementary simplicity, there enter many complicating factors, which render the perpetual inventory about as useful as a thermometer reading in deciding when to order coal.

Where a multiplicity of products are produced, whether they are products of straight manufacture or are derived products or byproducts, the complications begin, for sales departments are forever putting on drives to force the sale of some slow-moving item. And when some of the items are non-perishable or semi-perishable, while others are perishable, there are still more complications.

Somewhere between the extremes of supply inventories that are so small that production and sales may be delayed and supply inventories that are so large that packaging materials become obsolete before they are used or profits become almost unattainable, there lies a happy medium of procurement of supplies in the right quantity, at the right time, and of the right quality.

Before going into a series of case studies of the methods used by different concerns to control their procurement of packaging supplies, one should consider the important general principles that have come out of this study. The most important thing to realize of all is that somebody has got to forecast probable sales. Somebody has *got* to do it. The sales department ought to do it, but if the sales department will not, or simply cannot, do it, then it is up to the production department to do its own forecasting. In some successful concerns the sales forecasts are made by production departments with surprisingly accurate results, and have afforded ample data on which to order packaging materials on an adequate yet conservative basis.

When concerns are operated under very strict budgetary control, the comptroller of accounts probably has all the data needed for forward commitments on packaging materials and delivery specifications. But to say that a company operates on the budget plan, however, does not tell the whole story, any more than it does to say that a watch is a Swiss watch. The finest watches in the world come from Switzerland, likewise some of the poorest. Budgetary control is capable of such variable applications that it is impossible to lay down a system of packaging supply control that is applicable to a budgeted concern unless it is known to what extent this form of budgetary control is utilized.

Budgetary control is applied to the financial side of most businesses and has for its objective a predetermination of the amount of money to be

A MANAGEMENT FUNCTION OF FOOD ENGINEERING

Controlling Supplies

► No problem of control in the food manufacturing plant is more complex than in the supplies needed for packaging. They must be procured in advance of their need and somebody must forecast the probable amount. To complicate the control problem, approvals must be obtained from sales and advertising departments, and legal departments; purchasing departments often need extra time in which to bunch orders to get the best price. By solving the most difficult control problem —that of packaging supplies—the entire supply problem is adequated covered.—Editor

spent and to be received. This, of course, involves a forecast of sales and the probable prices that will be received. Only then is it possible to translate dollar sales volume into units of goods. Nevertheless one style or size of package may outsell in one section of the country and another style or size of package may outsell in another region. If the budget is to be useful in determining the amount of supplies to be purchased, it must show these regional breakdowns. A mere item of total dollar volume will not be of very much aid to the operating man ordering in his supplies if he produces a variety of items.

Another important matter is the distance apart between sales and production divisions of a company. If the main sales office is in one city and the plant or plants are miles away in another community, the set-up for adequate control needs to be somewhat different in character than one where the plant superintendent and sales manager have desks side-by-side, or at least can see each other several times a day.

Examples of plants operating under budgetary control are found in companies A and B in the confectionery industry. Company A operates at least two plants at considerable distance apart and might be regarded as one of the larger companies of intermediate size. Company B operates only one plant and is one of the smaller companies of intermediate size.

Because some of the cases studied have been laid open on the condition that the firm's name be not identified it is deemed advisable to refer to all the concerns by an alphabetical symbol only.

Company A

THE sales department of Company A sets up an estimated budget sales figure which is the total of the individual estimates of the company's salesmen for their respective sales territories. The basis for this estimate is the sales for the preceding month, sales for the current month last year, and the sales of the past month in comparison with the total sales of the past year.

With this estimate in hand, the sales department forecasts the volume for the coming month and informs the comptroller of the probable requirements for the coming month. The comptroller in turn instructs the purchasing department to make the necessary purchases.

The purchasing department watches the daily sales report which covers the orders on hand, the sales of the month to date, and the comparison of daily sales with the estimated forecast. If the sales show increase or decrease the purchasing department covers for additional supplies or slows up deliveries accordingly.

Stock on hand is usually for one week's requirements and is determined by a daily or semi-weekly inventory as one of the responsibilities of the plant superintendent or his assistant as well as by the records of the purchasing department.

Packaging supplies, such as boxes, cartons, wraps and liners, are purchased on contracts. The stock is usually run in advance for a period of not over 90 days based on estimated requirements and kept at sources of supply until called for.

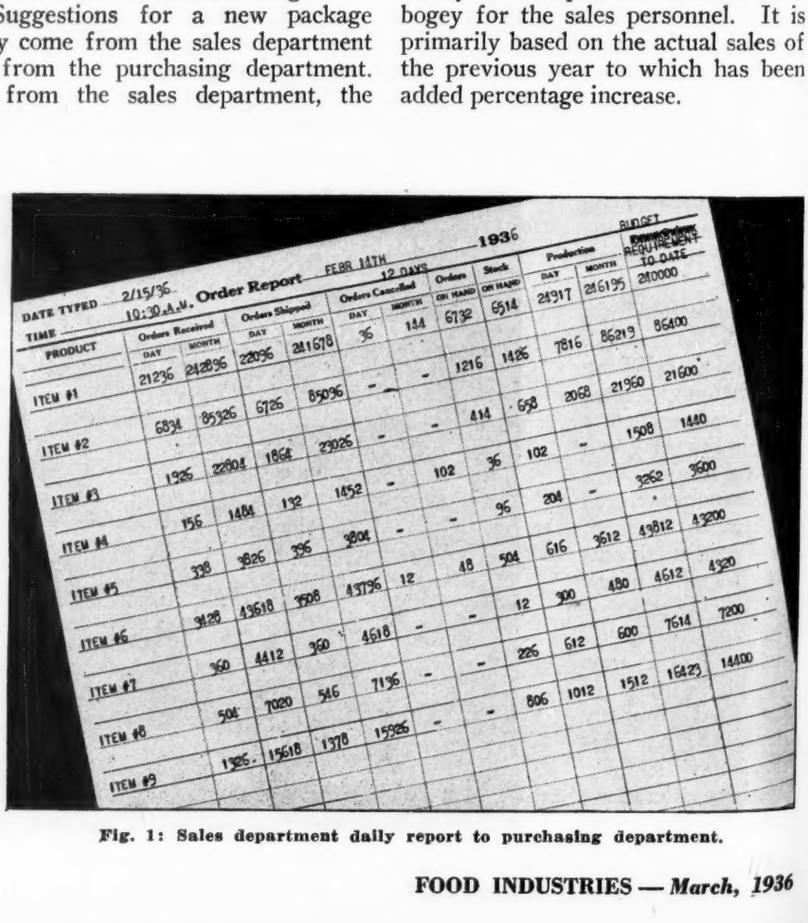
Strict adherence to budget requirements, adjusted according to sales actually made, make the carrying of large stocks or the possibility of being caught with any appreciable obsolete material almost impossible. Fig. 1 illustrates the form used to keep the purchasing department informed on the daily and monthly sales and their relation to the forecasted budget.

Suggestions for a new package may come from the sales department or from the purchasing department. If from the sales department, the desire may be to revise an existing package or to adopt a new type of package or wrap to increase sales. The purchasing department may suggest a revised or new package or wrap in the interest of economy or to take advantage of a recommendation made by a supplier of packaging materials.

As the company does not have a package specialist or packaging department, the procedure is to call in a package designer, a box maker, or wrap printer, as the case may be, and have him make up a sample specimen. The sample is submitted to the sales department and then to the factory production department for approval or suggested change. When the sample has been approved, sample lots are shipped to the field salesmen to get their reactions and those of the merchandising trade. Finally, the revised or new package is turned over to the purchasing department to make quantity purchases under specific requirements. From then on until further notice the package is considered standard and subject to regular procedure.

Company B

IN COMPANY B the sales department makes a forecast which in reality is a hoped-for attainment or bogey for the sales personnel. It is primarily based on the actual sales of the previous year to which has been added percentage increase.



DATE TYPED 2/15/36 TIME 10:30 A.M. **Order Report** FEBR 14TH 12 DAYS 1936

PRODUCT	Orders Received DAY	Orders Received MONTH	Orders Shipped DAY	Orders Shipped MONTH	Orders Cancelled DAY	Orders Cancelled MONTH	Orders On Hand	Stock On Hand	Production DAY	Production MONTH	BUDGET REQUIREMENT TO DATE
ITEM #1	21236	242896	22096	241678	36	144	6732	6514	24917	246195	240000
ITEM #2	6834	85326	6726	85096	-	-	1216	1426	7816	86219	86400
ITEM #3	1926	22604	1864	23026	-	-	414	658	2068	21960	21600
ITEM #4	156	1484	132	1452	-	102	36	102	-	1508	1440
ITEM #5	338	3826	396	3804	-	-	96	204	-	3262	3600
ITEM #6	3429	43618	3508	43796	12	48	504	616	3612	43812	43200
ITEM #7	360	4412	360	4618	-	-	12	300	480	4612	4320
ITEM #8	504	7020	546	7136	-	-	226	612	600	7614	7200
ITEM #9	1525	15618	1378	15926	-	-	806	1012	1512	16423	14400

Fig. 1: Sales department daily report to purchasing department.

As a basis for factory operations and letting of purchase contracts, the production manager makes his own forecast based on actual sales of previous year, current production to meet incoming orders, and general business conditions as he interprets them. On the basis of these factors he projects his production plans several months ahead and notifies the purchasing department of his requirements accordingly.

Purchase contracts are let on a quantity basis to cover needs for six months with a weekly delivery schedule for labels, wraps, and liners. Supply for 1½ weeks is kept in stock to meet emergency requirements. Cartons and shipping containers are bought on quantity basis usually six months' contract, with daily delivery schedule from local supply sources. Stock for 1½ days' requirements are kept on hand to meet emergency needs. Daily deliveries can be increased or curtailed as desired. Stocks on hand are checked by monthly inventory.

One very important feature of this company's set-up is its location in a very large city where supplies are quickly available.

Company C

WHEN production operations of a company are distributed throughout the country in a number of branch plants control over the purchase and inventory stock of packaging supplies become more complicated. This is particularly true when the company manufactures a large number of items, when some or all of its products are highly seasonal, and when the plants are remote from the headquarters offices.

Some companies exercise control rigidly through the main office. Others exercise a very flexible or supervisory control even to the point of having branch or divisional purchasing offices in different sections of the country. Still others operate between the two extremes.

A company in the baking industry is representative of those operating under the system of rigid central control. In this company the major responsibility for design, specifications, and supply of packaging materials falls upon the production department under whose control even the chemical and physical laboratories function.

The production activities of this company are distributed among a number of bakeries scattered over the United States making more than a hundred products. Some of these products are regarded as staples and are marketed in both bulk and consumer packages. Others are specialties marketed in consumer packages.

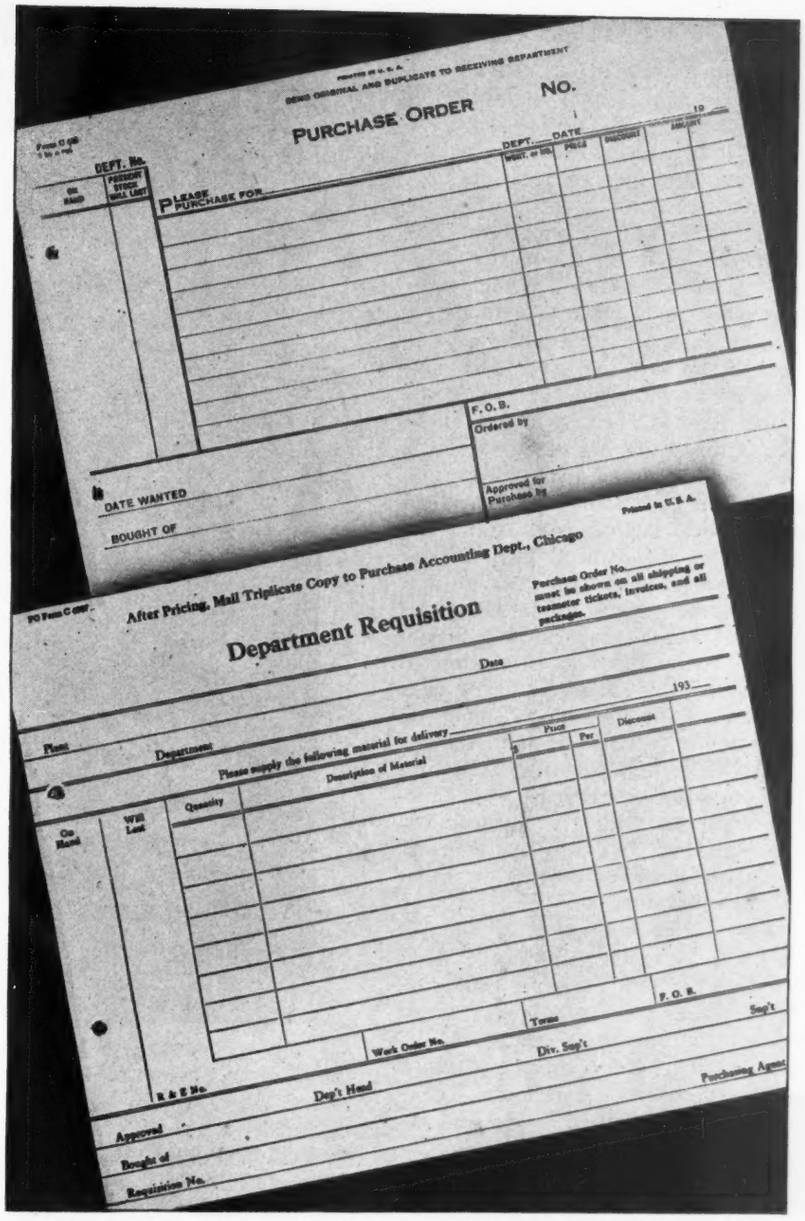


Fig. 2: Plant purchase order (top) and requisition type of purchase order.

In general the procedure is essentially the same for forecasting probable sales volume over a given time period for both classes of products and for setting in motion the machinery to obtain the necessary supplies and keep the wheels moving.

The sales department makes an estimate of probable sales volume in a stated time period for each item and indicates the style of package in which it is to be packed. This estimate is based on past experience and general business outlook for the period. For some, the standard staple products, the period is likely to be for the year. For the specialties the time may be for only a few months.

In any case this estimate is passed to the production manager for approval or adjustment to conform with capacity to produce within the time limitations designated.

Upon final approval by production and also executive departments the estimated sales budget for each item goes to the purchasing department, where it is broken down for the type and quantities of cartons, innerlining materials, labels, outer wraps, end seals, shipping containers, bundle

wraps, bundle seals, adhesives and the like needed.

The purchasing department's analysis of packaging supply requirements are forwarded to the proper source of supply to be translated into a production rate sufficient to meet the requirements of all plants using the different styles of packages, and contracts are made on a quantity basis against which shipments to each company plant can be made as wanted.

In all cases the production department designates the style, size and detail of construction for each component part of each package. These specifications are arrived at through the result of tests, experimentation, and studies by the company's chemical and physical laboratories. After the production department has worked out the details of each package and its component parts from the standpoint of being practical for filling, closing, wrapping and protection to its contents it is submitted to the sales department for approval or suggested alteration to increase its marketability and to the legal department to be sure that any printing carried by the package complies with the federal and state labeling laws and that there is no infringement of patents or trademark registration.

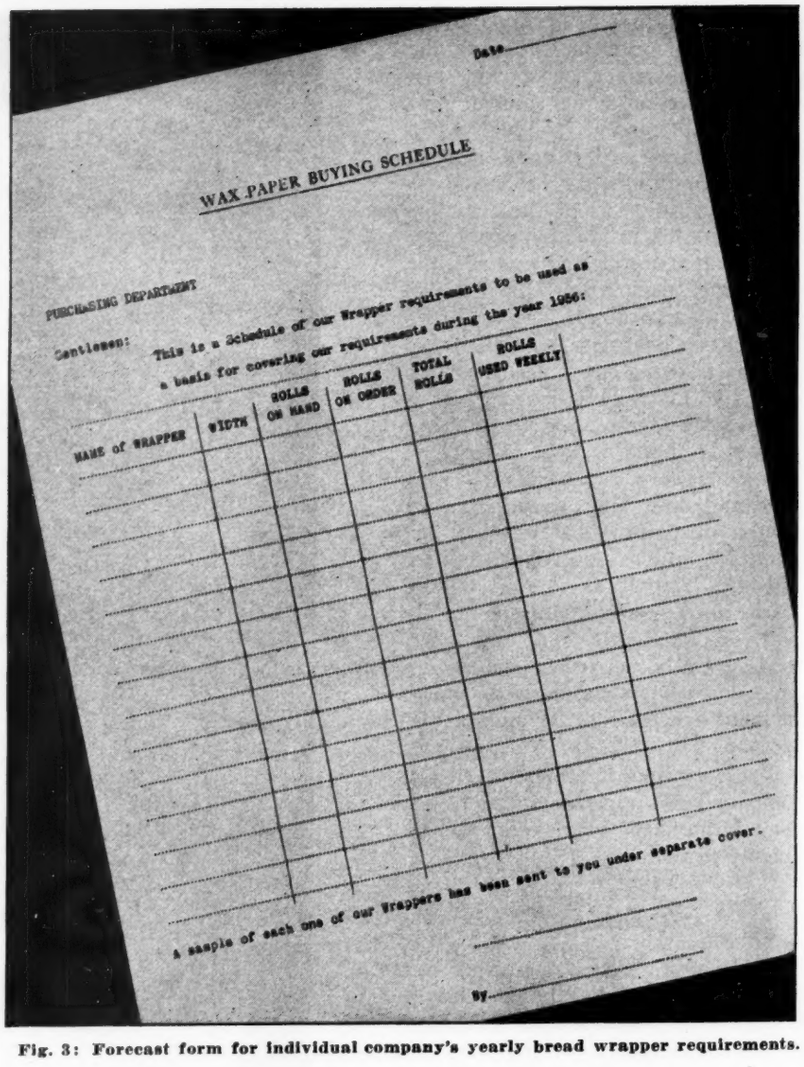
Any changes desired in adopted packages or their component parts must go through the same procedure before the purchasing department changes its buying specifications.

In each of the company plants is an organization or warehouse department which receives, holds, and delivers on requisition to the production areas all supplies necessary to the production requirements of the area.

Each warehouse department has a stock form for each supply item used by that plant in its production.

This stock form carries a record of the quantity of the item on hand, the quantity withdrawn on requisition, and a check record of the monthly inventory. The record is kept in up-to-the-minute completeness because of the system followed in the producing areas for each day's work.

The production schedule for the following day is laid out in conference by the department heads during the early afternoon. Following this conference each department head requisitions from the warehouse department in detail his supply requirements for the carrying out his portion of the production schedule. As the clerk in the warehouse department fills these requisitions preparatory to delivery to the producting area he enters the quantity of withdrawal from stock for each item upon his stock record form. In that way he has a perpetual inventory record which is checked by a monthly physical inventory. A copy of the monthly inventory is sent to the purchasing department.


Date_____

WAX PAPER BUYING SCHEDULE

PURCHASING DEPARTMENT

Gentlemen: This is a Schedule of our Wrapper requirements to be used as a basis for covering our requirements during the year 1936:

NAME of WRAPPER	WIDTH	ROLLS ON HAND	ROLLS ON ORDER	TOTAL ROLLS	ROLLS USED WEEKLY

A sample of each one of our Wrappers has been sent to you under separate cover.

By_____

Fig. 3: Forecast form for individual company's yearly bread wrapper requirements.

Because of the complexity of supply items carried and in some cases the remoteness of the food manufacturing plant from the source of supply a three to four months' supply, depending upon item, of printed wrappers and seals is kept on hand at all times so that the plant will be able to tide over any reasonable emergency that may arise. The average quantity of the item used over the previous seven months' period is the basis of estimating what constitutes a three to four months' supply. When the daily perpetual inventory shows that the order point has been or is about to be reached a requisition to the main office purchasing department is made for the quantity of the item taken out of stock during the past month.

Plain or standard stock items are contracted for on a three to six months' basis, depending upon the item and the location of the source of supply. Here again the warehouse department of each plant carries a three to four months' supply of each item on hand, and requisitions from the purchasing department a month's requirement when the order point is reached. The purchasing department in turn orders shipment to the plant making requisition.

To avoid any deviation of shipments from the specifications upon which the supplies were contracted, samples of the shipment being made are sent direct to the purchasing department and the plant requisitioning new supply sends six units of items

being used from previous shipment. The samples are turned over to the chemical and physical laboratories for comparison and checking with authorized specifications. Laboratory tests of materials being used are made monthly. In this way reasonable uniformity in quality and physical specifications are maintained.

Carrying three to four months' supply of packaging items in stock in the warehouse department of each plant entails considerable expense and a tie-up of capital funds. Yet the diversity of the products and the fluctuation in orders due to climatic changes, and ofttimes unexplainable reasons justifies the carrying of these long stocks as the company's safeguards against full depletion of stock in an emergency.

Company D

AN EXAMPLE of a company having a number of branch plants and operating on a flexible or supervisory control basis is found in the meat packing industry. In this industry the supply of raw material to be processed and packaged is a variable and depends solely upon the decision of the farmer or feeder to market his animals. Consequently instead of forecasting sales the meat packer has to forecast how many animals of the various kinds and grades are likely to be marketed and when.

In anticipation of the movement of animals from the farms and feeding yards to the slaughter houses the company's general purchasing agent sends to all plant superintendents a list of all supplies, including packaging materials, telling exactly the amount of stock to carry and the number of days required for replacement. On most items of packaging supplies, the plant superintendent is instructed to carry a stock sufficient to last for 30 days. Thirty days are also required for replacements. In a few instances these figures are slightly smaller. The 30-day period for replacement permits enough time to shop around and get the best price.

On this list that goes to every plant superintendent, the various commodities required in packaging are divided into groups, such as twines, fiber boxes, corrugated boxes, wrapping paper, bottles, and the like.

Just what constitutes a 30-day supply of packaging materials is something of a variable figure. It depends upon the number of animals that can be normally expected to arrive at the plant for slaughter. Accordingly, each plant superintendent is advised by the executive department of the corporation about the probable runs of animals. This information arises from the department of economic research of the company. The responsibility for translating this advance information into a 30-day supply of packaging materials rests with the plant superintendent.

In the office of each plant superintendent is a clerical worker who is responsible for all supplies in the plant. Each foreman, however, is responsible to the plant superintendent for the supplies for his department, including those supplies that are usually under his jurisdiction, even though they may be in a special stockroom outside of his own department. The location of the stockroom depends upon the amount of space available in the department. Each foreman is required to check regularly to determine the amount of supplies on hand and whether or not he has a 30-day supply.

When in need of ordering new supplies, the foreman writes a supply order (Fig. 2) which is forwarded to the plant superintendent's office. The clerk records whatever information is necessary in his records, the superintendent approves the supply order, and then it is forwarded to the purchasing department at the plant. The function of the superintendent in approving of a supply order is to act as a common-sense censor. It is found advisable to do this because sometimes foremen may need restraint when specifying quality or quantity.

On the supply order made out by the foreman and approved by the superintendent are a pair of columns in which are entered the figures showing the amount on hand and how long this supply will last.

Branch houses, wholesale markets, produce plants, oil mills, poultry plants and other divisions of the company handle their packaging supplies in exactly the same way, except that branch house supply orders go to a district superintendent who approves or disapproves of the order in exactly the same manner that would be done by a plant superintendent.

The purchasing department of the corporation is zoned much like the branch houses except that the zones of the purchasing department includes usually more than one branch house. In each zone is a zone purchasing department located always at a factory. The branch house or branch plant purchasing order goes to the zone purchasing department. This applies both to orders arising from plants, *i.e.*, regular slaughter houses, and from branch houses, or produce plants.

If the article specified can be bought locally, a price is put on the supply order, giving the zone purchasing man information on which to base a judgment as to whether to return it to the local man for purchase or to act otherwise.

The zone purchasing agent may pass the order on to the main office with his prices also on it. His decision to purchase from a source within the territory under his jurisdiction or to forward it to the general purchasing department at the main office depends largely on whether volume controls the price or whether his zone purchasing office can get just as good a price as the central purchasing department. In such matters as printed matter, the volume largely controls the price and, therefore, most printed matter is bought from the main office.

The zone man may combine orders from several sources within his jurisdiction in order to get a carload rate on delivery to a central point in the zone. Such supplies are frequently redistributed by company trucks. This method of purchasing is something of comparatively recent origin and depends upon the existence of large fleets of motor trucks and good roads. Before concrete highway systems were so widespread the zone purchasing departments could never function in this manner.

The foregoing information refers to routine handling of purchasing of replacement packaging supplies. Other factors may come into the situation, as anyone with experience will know. For example, if the sales department is putting on a campaign on any product, it is required to give 30 days' advance notice to the purchasing department and to the interested plant superintendents. This means that there are never any unexpected campaigns, in theory, although in actual practice campaigns are sometimes put on with considerably shorter notice. However, it is up to the sales department to give advance notice of the campaign, the 30 days usually being what the purchasing department thinks is necessary to procure the necessary supplies without excessive cost.

Referring to the 30-day stock of goods supposed to be kept on hand,

during the hog shortage existing in the last year and a half the 30-day supply was reduced in number of units, but not in number of days.

On the matter of specification for packaging materials, the general purchasing department has the policy of "pushing back" until the plant superintendent refuses to recede farther from his demands. When the plant superintendent has an idea of what he considers to be the proper packaging specifications for a product, even though it may differ from preceding practice, he is at liberty to specify the different material on his supply order. However, if the material is more expensive or heavier weight than has been used before, the purchasing department has a division on packaging materials whose function it is to resist all increases in expense and to try to persuade the plant superintendent to use something that is not as expensive. This activity is the "pushing back" referred to. For example, the plant superintendent may specify tin cans made out of 107-lb. plate. The packaging division of the purchasing department will go back at the plant superintendent to know why 95-lb. plate or even 90-lb. plate will not do just as well. Sometimes a prolonged discussion ensues which uses up a very considerable portion of the 30-day period required for replacement. The time is finally reached when the plant superintendent refuses to give way any further as to the adequacy of the packaging material, and then the purchasing department buys whatever is compromised upon. When a satisfactory purchase has been made after such a debate between the purchasing department and the plant superintendent, and after it has proved to be a satisfactory material, a bulletin is usually gotten out to other plant superintendents informing all of them of the new material and the results of its use.

An important feature of the foregoing is the incentive plan which is in force to reward anyone who is able to show how to effect a saving in any way. Thus, the man in the purchasing department who can persuade a plant superintendent to use something that does not cost as much will receive a reward or the man in the plant who discovers that a cheaper material can be used can also claim a reward.

This company has no packaging department set up as such. However, all suggestions from any source whatsoever gravitate to the plant superintendent in whose plant they originate and then to the general superintendent's department.

The superintendent's responsibility is to order only supplies that have already been approved as successful, but the various purchasing departments are often a source of suggestions to the plant superintendent as to better ways or cheaper ways of doing things. At any time the purchasing department can go back at the plant superintendent with suggestions as to ways of accomplishing economies or betterments in packaging.

In the matter of controlling supplies, the system is somewhat variable in different plants of the company because the amount of storage space available is often a very important factor if not the controlling factor. Some plants are so crowded that storage space is at a premium and, where it is easy to acquire the supplies on short notice, the purchasing department notifies that particular plant that the stock on hand at all times may be less than the usual 30-day period.

The system of control employed is a very loose one. Many times outsiders have commented adversely upon the system, but the company found it is a system much cheaper to operate than a so-called "tight" system. If the company were to keep control accounts of every individual item of supplies, either in plants or in the general offices of the corporation, the executives feel that double the present clerical force would be necessary. The theory on which the company operates is that the losses occasionally incurred by failure to keep accurate check on all supplies are much less than the money which would be perpetually lost by having a more accurate and exacting clerical handling of the enormous amount of materials required in a corporation of that size.

Regarding ordering a supplier to manufacture and hold, this company believes this a very dangerous procedure unless advance approval from all departments interested in a package or packaging material has been obtained. Experiments in using the "make and hold" system in the past have sometimes resulted unfavorably where a packaging material has been found obsolete long before the supply at the manufacturer's plant was used up.

On the matter of labels and other printed matter used in packaging, the advertising department, the sales department and the general purchasing department work together. In this company the plant superintendent merely has to order labels for what he wants from the purchasing department. It is up to the purchasing department to be sure that the sales and advertising departments are agreed on the copy or style or wording needed. This also includes responsibility of the advertising department to work with the legal department to be sure that all legal exactions are met.

Company E

AN EXAMPLE of a company having plants scattered over a goodly portion of the Western Hemisphere and packaging a large variety of both seasonal and non-seasonal products may be taken from the canning industry.

For packaging its seasonal products this company requires but few supplies. The principal one is tin cans. Other items are labels, shipping containers, paste or glue. One or two plants require glassware, caps and bottle labels, as well as cases and separators.

The procedure is as follows: A budget is made up showing the intended pack to be put up at any given plant. This budget must be approved by the operating department in the general superintendent's office, by the sales department and by the vice-president in charge of that division. After the budget is approved, usually several months before the pack begins, it is customary to place an order with the purchasing department (a purchase order, top of Fig. 2) for 60 per cent of the estimated needed supplies. Deliveries of this 60 per cent are specified to take place beginning about one week before the pack begins, the balance of the requirements to be delivered about one week apart, except that tin cans are delivered every day and are used directly from the cars instead of running them into storage and then out of storage. The amount of cans in storage is merely a reservoir to tide over a period when shipments are delayed.

Tin cans are available on very short notice, usually only two days advance order being necessary to get delivery of cans at any canning plant under this company's ownership.

As the packing season advances and some more accurate knowledge of the probable amount of goods to be produced becomes available, the balance

of the supplies needed is ordered. The amount, however, may be increased or decreased from the budget figures. In some years, such as 1934, when the pack was very small, because of the drought, the 60 per cent ordered early in the year was found to be more than enough to take care of the entire volume of pack.

As a rule, budgets for various plants are made up and approved in January of each year. Some hold over as late as February.

The packing season may be in June, July, August, September, or October. Although the supply orders are made out and sent to the purchasing department for the first 60 per cent of the estimated needs, the purchasing department does not necessarily place the orders at that time. It may be making arrangements or bunching orders for a consolidated large order.

In this company's purchasing department is a bureau called the Label Department. This department is responsible for all labels. It decides in conference with the sales department on the style of the label and the printing. It also confers with the general laboratory on strength of paper, quality of ink, and similar technical matters. This is carried out so that the plant superintendent need only order what labels he wants, specifying the product and the size of the containers to which they are applied.

One feature of the operation of controlling packaging supplies is a campaign of education of plant superintendents to put size specifications for labels onto supply orders. This procedure is being followed as rapidly as it can be enforced in order to avoid possible confusion because of lack of complete standardization of can sizes. Some tin cans differ from each other only by a few sixteenths of an inch. When the exact can size is marked on the label order there is much less likelihood of getting the wrong size of label than if it is designated by the can number.

Controlling non-seasonal packaging supplies is more difficult than controlling seasonal supplies. Non-seasonal supplies include such items as pork and beans, pickles, olives, jellies, meats, and the like.

Naturally to control the amount of materials on hand or on order, it is necessary to make an advance estimate

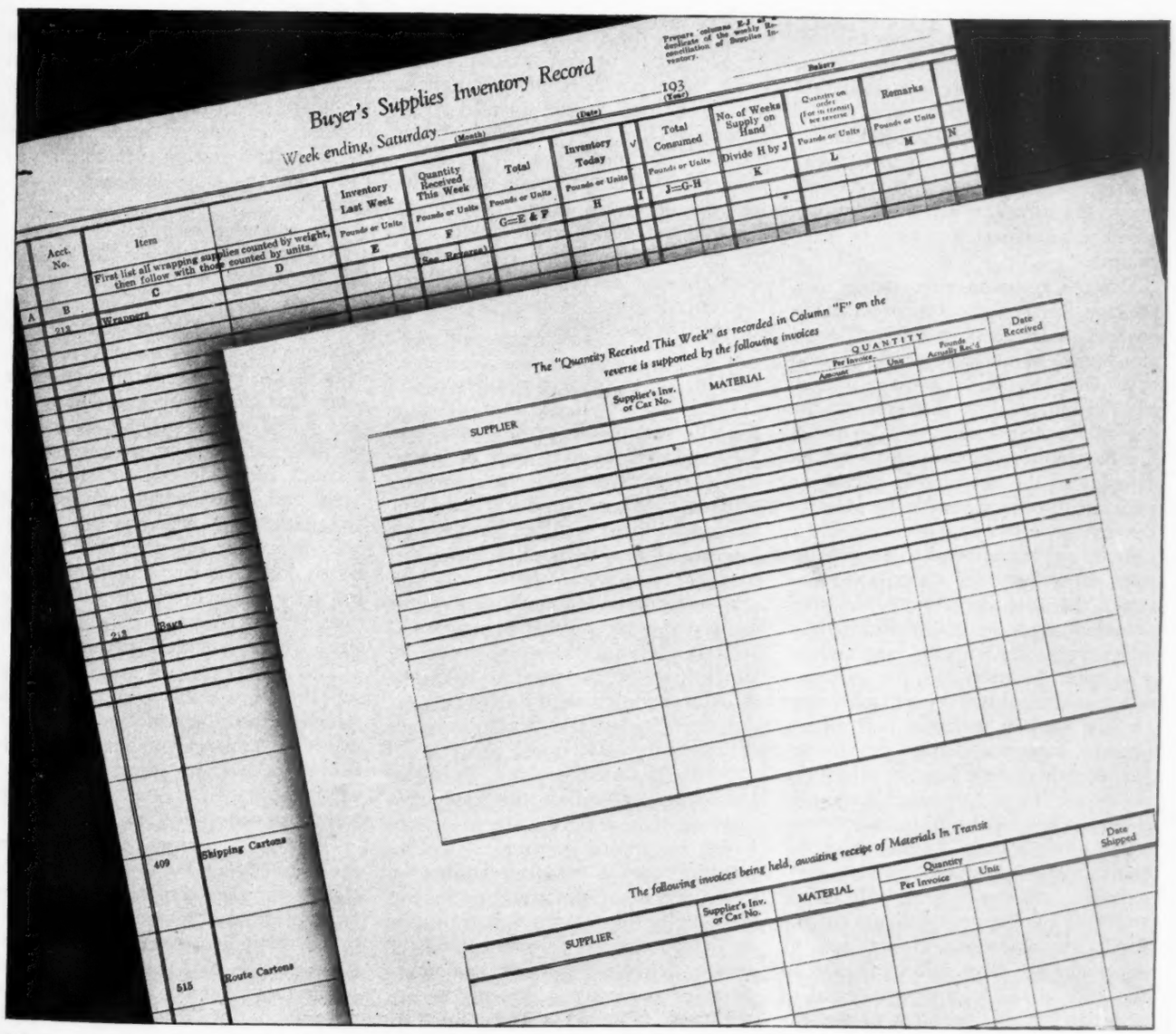


Fig. 4: Individual company's weekly inventory record. On the back of the sheet is a record of supplies received during week and a record of materials in transit on which invoices have been received.

of the amount to be shipped. In order to facilitate the ordering of these supplies, those plants packing non-seasonal items, make up each month a packing and supply schedule covering four months' shipments. This schedule covers each commodity, number of cases, amount required, amount on hand, on order and amount to order. Requirements for labels are made on a basis of 100 per cent of the schedule while other supplies such as glass, caps, boxes, are ordered on a 50 per cent basis. This procedure enables the label department to order labels for these items every thirty (30) days if necessary.

Estimates prepared as above are, of course, referred to the product sales departments in order that they may advise of any sales campaigns they may be planning on any of these items. This precaution is important for the reason that, if it becomes necessary to order additional labels, it takes from 45 to 60 days to obtain them from the printers, and furthermore shipping cases should be ordered not less than three weeks prior to the packing of the products.

Regardless of all efforts to forecast probable sales, both the sales and operating departments have sometimes failed to anticipate increases in sales volume.

When a recommended change in a package has had the approval of the product sales department and the vice-president in charge of the division in which the particular package is used, the recommendation then goes to the general superintendent who requests the purchasing department to submit samples of the package or packaging material to conform with the ideas of the approved recommendation. These samples are turned over to the product sales department for a conference between the sales department, the vice-president in charge of the division, the advertising department, and others who might be interested, for approval. If tentative approval is given, only then are the sample packages sent to the general superintendent's department for referring to the plant in which the goods are to be produced to see if there are any operating problems entailed in their use. At this point the plant superintendent comes very strongly into the picture. He either approves of the new package or sets forth his objections to its use, or states exactly what will be needed in the way of additional equipment in order to permit the plant to use the new package. In the event of objections arising from the plant superintendent, the whole matter is referred to the vice-president in charge of that particular division of the company, who decides whether or not it is advisable to spend the necessary amount of money to utilize the new package. If the vice-president disapproves, then of course the old package must be continued in use until something is discovered that will meet the desires of the sales division or can be operated on existing equipment.

In case there is no disapproval from the plant superintendent, the interested parties are notified of approval of the new package and it is purchased whenever the old supplies run out. One important feature of the label department (a branch of the purchasing department) is the responsibility of the label department to confer with the legal department on the phraseology and wording of labels.

At times, the system of controlling the acquisition of non-seasonal packaging materials falls down, but it is usually a man failure instead of a failure of the system. One of the more difficult matters is to get compliance with the instruction that every one concerned in filling out forms shall fill out every single space with the desired information. In the absence of the necessary information the central office is sometimes unable to function intelligently.

Company F

ONE system of group-buying is employed by a group of associated relatively small, independent, wholesale bakers producing largely wrapped bread. The purchasing, keeping of records, and ordering delivery of supplies are portions of the service rendered to the affiliated group by a corporate service organization. In this instance the system can be simple because the product is essentially a single one and has to be produced each day for consumption in approximately 24 hours.

Although memberships in these groups are generally maintained for a number of years they are in reality based on annual contracts. Consequently when a company becomes a new member of the group or renews its membership contract it transmits to the purchasing department of the service organization a schedule of anticipated wrapper requirements for the year (Fig. 3). These requirements are based on the quantities used during previous years. Such estimation is feasible because in the main the companies make essentially the same types of products from year to year, market their products in a local sales area, and have a fairly constant year-to-year production.

On the basis of the yearly estimates supplied by the member companies the purchasing department of the service organization places the purchase contracts with the selected sources of supply, stipulates the size, design, and quality specifications, assumes the responsibility of keeping a check on the individual member's stock-on-hand, and orders out shipments against the yearly contract to conform to the individual member's requirements. Contract with the manufacturer of the wrapping or packaging supplies calls for delivery within five to six weeks to the most distant member after receipt of shipping instructions. Members closer to the source of supply get delivery within two weeks, especially in the areas reached by motor truck service. The wrappers have the same basic specifications. However, each company has its wrappers slug-printed with its own company name and variety designation.

The company member, at the outset of its membership in the association, is stocked with a twelve weeks' supply of wrappers and is expected to keep an eight weeks' supply on hand against emergencies. When records in the central purchasing office show that the member company has only a ten weeks' supply on hand a warning card is sent suggesting that a check be made on the supply on hand and that instructions be sent authorizing the ordering out of requirements for the next four weeks. By so doing the new shipment should reach the company member about the time he has begun to draw on his eight weeks' emergency stock.

The service organization not only supplies the member company with a standard form on which to report his yearly requirements, but also with forms for keeping weekly inventory, shipments received, and shipments in transit records (Fig. 4).

Style and designs for wrappers are worked out by a packaging specialist in the service organization from original ideas and from suggestions sent in from company members. New designs and styles are referred to the packaging committee of the organization for study and approval before being submitted to individual member companies for adoption.

Stoneware mixing crock for syrups.

Glass and Ceramic Materials

Solve Problems of Corrosion, Sanitation and Inspection

SPACE limitations dictated omission from the December, 1935, number of FOOD INDUSTRIES of a table covering the properties of glass, glass lining, glass piping, chemical stoneware, brick and tile. Because of the importance of these materials in the food industries, this compilation is now published, appearing on the following page. While it does not list every material and by no means every manufacturer of products of these types, it provides examples which will give the food-plant executive a picture of the advantages of the materials, so that he may compare them with metals, alloys, concrete, wood, rubber and plastics when considering a new plant or new equipment.

At the risk of repeating what may have been said in individual articles on these materials in the December, 1935, Materials of Construction number, we will touch upon the outstanding characteristics and applications of these materials in the following paragraphs as an aid to better understanding of the table.

Because of its non-porous, highly acid-resistant surface, glass-lined equipment finds wide application where it is necessary to obtain protection against metallic contamination of the product, corrosion of the equipment; or to effect easy and complete sterilization of the apparatus. It is used most extensively in processing, storing and transporting milk products, where protection of taste, purity and sanitation are paramount. It has long been used in storage and fermentation tanks in breweries and is quite popular in plants handling mayonnaise, salad dressing, glucose, vinegar, and edible oils. Tomato products are advantageously concentrated in glass-lined vacuum pans or open cookers, as are such vegetable products as prepared baby soups. Fruit processors, too, are large users of this type of equipment, especially in vacuum pans for handling jams, jellies, preserves, and fruit concentrates of all kinds, while beverage manufacturers employ it with syrups. The preparation of coffee and vanilla extracts and the processing of by-products where acid conditions exist are other operations for which equipment with a glass lining of the type fused to metal has been found efficacious.

Glass-lined equipment will withstand heat and heat shock, because the glass enamel has a coefficient of expansion approximating that of the steel shell. But on account of the silicate base in the lining, caution must be exercised in exposing it to alkaline solutions.

Another type of glass-lined equipment, concrete tanks with a glass inner wall, finds wide application in the wine industry and in brewing for fermentation and storage units.

Glass tubing, in a special form which is unaffected by heat shock, gives manufacturers a pipe line that not only shows what is inside it, but is proof against corrosion and product contamination. Furthermore, it is easily cleaned and sterilized. Its transparency permits quick detection of "pockets" or possible dead-end troubles and allows inspection of the product which it conveys for clarity, color, and complete mixing of constituents. Glass pipe lines may be used with pressures up to 50 lb. per sq.in.

CERAMIC materials afford the industries something impervious even to the most destructive of chemicals, excepting only hydrofluoric acid and concentrated hot caustic which are not employed in food processing. For this reason, chemical stoneware finds many special uses in such plants as those processing mayonnaise, mustard, soups, bouillon cubes, ginger ale, vinegar and fruit juices. Perhaps the biggest disadvantage of this material is that it will not withstand severe mechanical or heat shock, although special forms are said to be highly resistant.

In the form of brick and tile, ceramic materials are very widely employed in food plants to provide floors and walls that are impervious to the action of fats, oils, acids and moisture, and to make plant sanitation easy. Brick also finds favor where there is need for a flooring material which is capable of giving long service under a heavy traffic of iron-wheel trucks.

In putting in a floor, heavy bricks are laid over a suitable base and joined with acidproof cement, this type of floor being conveniently installed over an old floor of another type and being relatively easy to take up for replacement. Ceramic floors also are made by laying tile in a wet concrete base, the concrete acting to reinforce the tile.

Food Industries Data Sheet

GLASS AND CERAMIC MATERIALS

Recommended by Manufacturers for Use in Food Plants

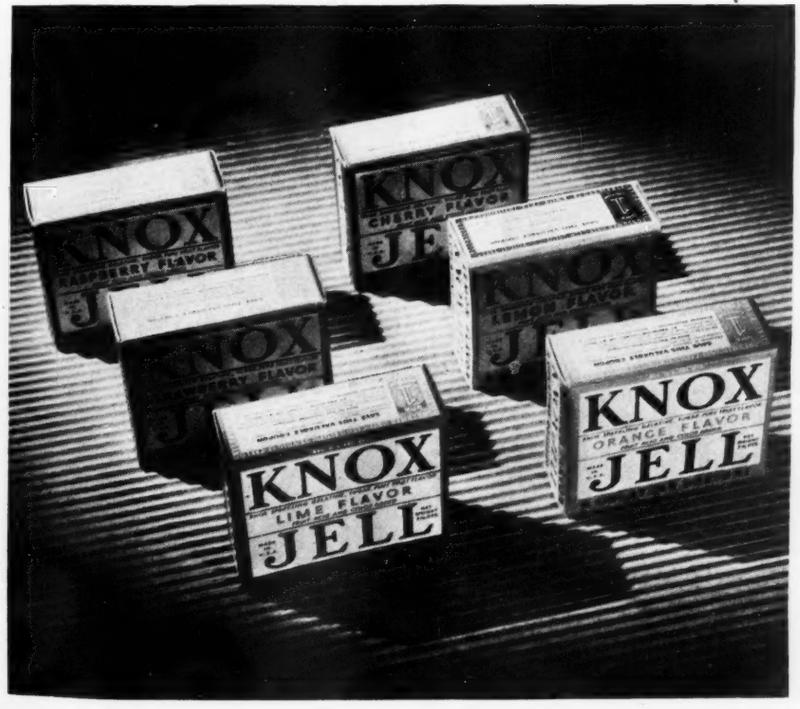
Material	Manufacturer* Supplying Data	Trade Name* or Common Name	Nature of Material	Specific Gravity or Weight	Linear Coeff. of Expansion	Effect of Heat	Elasticity	Heat Transmission. or Thermal Conductivity	Resistant to Abrasion	Resistance to Action of Food Ingredients	Solubility in Food Ingredients	General Applications	Methods of Fabrication	Forms Available
Glass	Corning Glass Works Corning, N. Y.	Pyrex	Boro-silicate glass	2.25	.0000032 from 19°–350° C.	Indifferent to general service heat shock	Coeff. = 6230 Kg. per sq.mm.	Better than plate glass		Resists action of all common food ingredients	Practically none	Oven doors, sight glasses, etc.	Prefabricated at maker's plant	Sheets, tubes and special forms
Glass Lining	Pfaudler Co. Rochester, N. Y.	Glass Enamel	Boro-silicate fused to steel			Resists thermal shock				Resistant to all common food ingredients	Insoluble	Processing equipment, tanks, kettles, pipe	Prefabricated at maker's plant	Regular equipment and tank sizes
Glass Lining	Borsari Tank Corp. of America New York, N. Y.	Glass Tile								Resistant to all common food ingredients	Practically none	For tanks and vats used in wineries, etc.	Fabricated in place as glass-lined concrete tanks	Tanks of rectangular shape
Glass Piping	Corning Glass Works Corning, N. Y.	Pyrex	Boro-silicate glass	2.25	.0000032 from 19°–350° C.	Indifferent to general service heat shock	Coeff. = 6230 Kg. per sq.mm.	Better than plate glass		Resists action of all common food ingredients	Practically none	Conveying liquids where inspection, sanitation and contamination are problems	Prefabricated at maker's plant	Either straight or curved, with special forms
Chemical Stoneware	Maurice A. Knight Akron, Ohio	Knight-Ware	Ceramic	1.3 oz. per cu.in.		Resists heat and shock			Yes	Resistant to all common food ingredients	Insoluble	Processing equipment, pipes, valves, jars	Shaped at maker's plant	Standard and special forms
Chemical Stoneware	United States Stoneware Co. New York, N. Y.	Stoneware	Ceramic	1.31 oz. per cu. in.	2.2×10^{-6} per deg. F.	Resists heat and shock	Modulus = 6.1×10^{-6} lb./sq.in.	1.8 B.t.u./ Ft.²/in / hr. /° F.	Yes	Resistant to all common food ingredients	Insoluble	Processing equipment pumps, valves	Prefabricated at maker's plant	Standard and special forms
Chemical Stoneware	General Ceramics Co. New York, N. Y.	Stoneware	Ceramic	2.2-2.5	$1.46\text{-}2.93 \times 10^{-6}$/°F.	Resists heat and shock	Youngs Mod. $5.3\text{-}12.2 \times 10^{6}$ lb./sq. in.	5.6-18.0 B.t.u./sq. ft./ in./hr. /° F.		Resists food ingredients, acids, etc	Insoluble	Tanks, pipes valves, pumps, specialties	Prefabricated at maker's plant	Standard and special forms
Special Stoneware	United States Stoneware Co. New York, N. Y.	Acitherm	Ceramic			Resists high heat and extreme thermal shock			Yes	Resistant to all common food ingredients	Insoluble	Processing equipment, pumps, valves	Prefabricated at maker's plant	Standard and special forms
Brick or Tile Acid-Proof	Maurice A. Knight Akron, Ohio	Knight-Ware	Ceramic	1.302 per cu.in.		Resists heat and shock			Yes	Resistant to all common food ingredients	Insoluble	For lining tanks, etc.	Shaped at maker's plant. Laid in cement	Standard and special forms
Brick or Tile Acid-Proof	Patterson Foundry & Machine Co. East Liverpool, Ohio	Porox	Ceramic	144 lb. per cu ft.	4.13×10^{-8} per deg. C.	Resists 2,500 deg. F.		.6 B.t.u. /hr./sq.ft. /° F./ft	Yes	Resistant to all common food ingredients	Practically none	For floors, tank linings, grinder linings	Shaped at maker's plant. Laid in cement	Hex. floor tile, tank blocks, etc.
Brick Acid-Proof	Harbison-Walker Refractories Co. Pittsburgh, Pa.	Duro	Ceramic	140 lb. per cu.ft.					Yes	Resistant to all common food ingredients	Practically none	For floors and acid tank linings	Brick, to be laid in acid-proof cement	Standard and special sizes
Floor Brick	Drehmann Paving & Construction Co. Philadelphia, Pa.	Drehmann Floor Brick	Ceramic							Resistant to all common food ingredients.	Practically none	For floors	Shaped at maker's plant	Brick
Wall Tile. Tile Tanks. Tank Linings	Kalamazoo Tank & Silo Co. Kalamazoo, Mich.	Vitrified Glazed Tile	Ceramic							Resists food acids, cleansers, etc.	Practically none	For walls of factories, storage bins	Hollow tile to be laid in acid-proof cement	Standard and special shapes
Floor Tile	B. Mifflin Hood Co. Daisy, Tenn.	Vitrified Tile	Ceramic						Yes	Resists food acids, alkalis, cleansers and sterilizers	Practically none	For floors	Tile to be laid in acid-proof cement	Tile

*Products and manufacturers listed are merely exemplary. There are many others in this field.

Food Packages and Products

Standard But Distinctive. Even so prosaic a package as a catsup bottle can be given a distinctive appearance without departing fundamentally from the customary design. This is demonstrated by the new bottles for the tomato catsup manufactured by J. Weller Co., Oak Harbor, Ohio. Broad, light-reflecting facets on the tapered portion of these containers attract attention to the product and give it an air of quality. White slip-cover caps add to the effect. The company's chili sauce bottle makes a nice appearance, too, as may be seen in the group picture.

Family of Six. To create a family of packages that would successfully introduce into a highly competitive market a gelatine dessert in six flavors was the problem of Knox Gelatine Co., Johnstown, N. Y. The design developed to meet the situation is one with high shelf readability on the face and both ends of the carton. This not only "loudly" proclaims the name of the product but permits instant identification of the flavor, and this without restricting the method of piling the packages on the shelf. Different colors also are employed to differentiate between the flavors. One side of the package carries a premium coupon.



Easter Special. Looking forward to Easter, R. C. McAteer Co., Pittsburgh, has developed a carton for eggs which also contains a package of the company's food tints. The idea is to make one product help sell the other and provide the profit of a specialty on both. The carton has a recess in the separators to accommodate the box of tints. The lid of the carton is decorated in Easter colors as a suggestion of its purpose.

Intensified Food Color. So intense is the "colloidal black" food color developed by A. A. Lund & Associates, New York, that from 2 to 5 oz. ordinarily is sufficient to impart a jet-black color to 100 lb. of product.

sterilizers
Tile
Daisy, Tenn.
Floor Tile
*Products and manufacturers listed are merely exemplary. There are many others in this field.
936

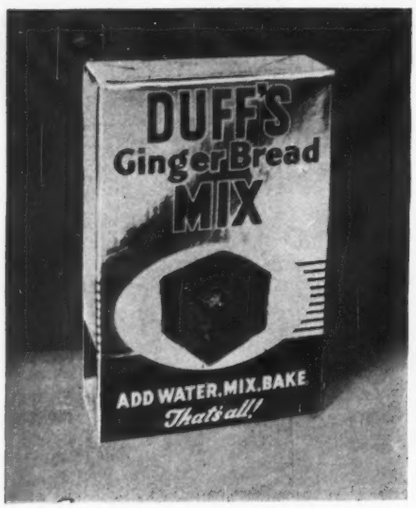
This new color comprises colloidal carbon intensified with vegetable and aniline food colors. It imparts to foods no off-taste, grit, "color-spectrum" effects, "graining" or alteration of texture, the manufacturer maintains.

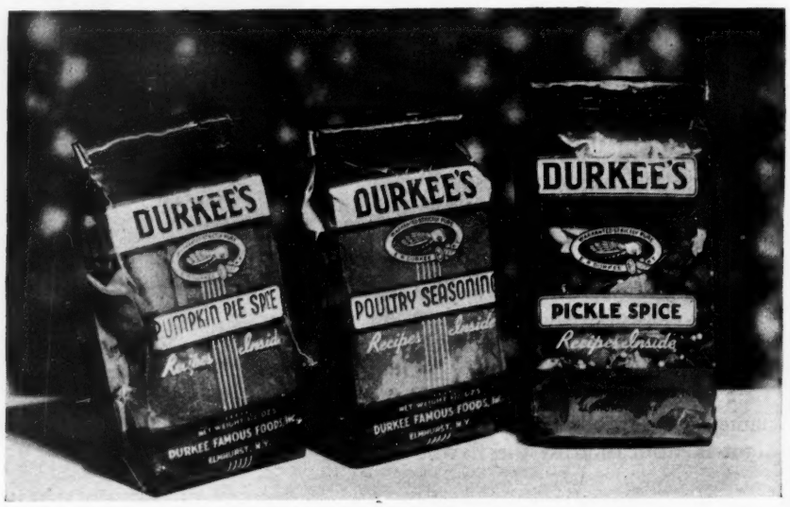
From Can to Carton. Distribution in a selected list of cities of ginger bread mix in a new package has been started by P. Duff & Sons, Pittsburgh. Formerly put up in tins, the mix now is contained in a carton lined with wax paper and covered with a tight wrap of paper-backed metal foil. Printed in green, white and brown on a silver background, the outer wrapper dresses up the package and at the same time provides protection against absorption of moisture, insect infestation and deterioration of the leavening agent. Being cubical in shape, the new container occupies less space in shipment and in the retail store. Another advantage attributed to it is ease of opening.

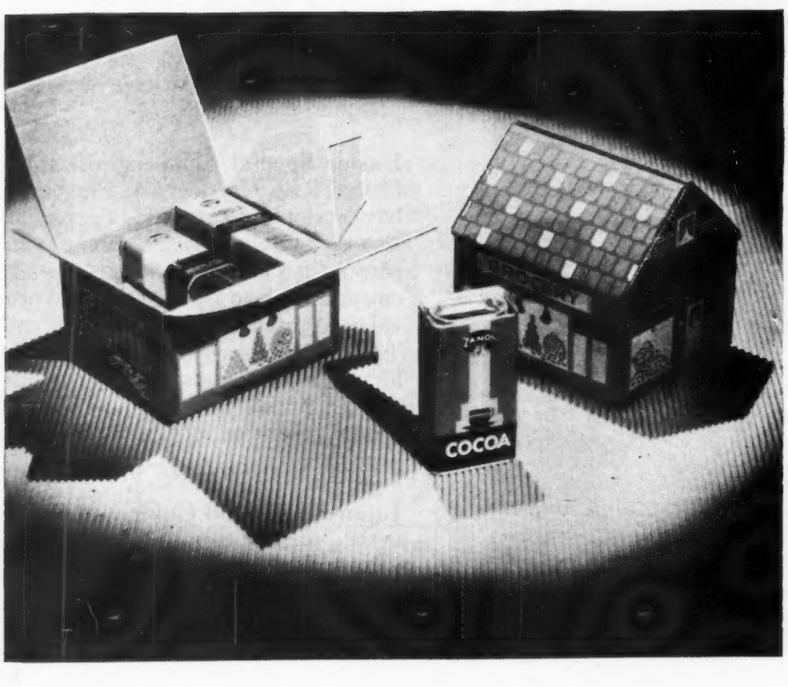
Additional markets will be supplied with the new container as soon as the change-over in the packaging line-up is completed, it is reported.

Carton Becomes Toy. A carton so designed that it becomes a premium to homes with children is being employed to boost sales by Zanol Products Co., Cincinnati. Made of corrugated fiberboard, the carton may be converted into a toy grocery store when empty. This premium box moves Zanol products in large volume because it contains five foods used in every home, the increased volume in turn permitting a lower price to the housewife. Another advantage of a packaging idea of this nature is that it gives the salesmen, who sell from door to door in this case, an added impetus.

Good Spice Packages. Effective packages for spices and seasonings have been created by Durkee Famous Foods, Inc., Elmhurst, N. Y. Of transparent cellulose, the bags have double walls to withstand rough handling and to prevent sifting. They are closed by folding over at the top, a tin insert being bent over the fold to fasten it. This permits easy and







effective reclosing. The artistic design of the packages is interesting, good use being made of color bands and panels to highlight the name of the manufacturer and the name of the product. All other elements stand out clearly and, of course, the product may be seen, too. In the way of colors, green is employed on the top and bottom, with white panels and red borders on the faces of the bags.

Better in Three Ways. Three benefits have accrued to Beech-Nut Packing Co., Canajorharie, N. Y., as results of redesigning the package for its macaroni and spaghetti products. Better display on the retailer's shelf obtains with the new "vertical" carton than with the long, slim "horizontal" box formerly used. The type has been simplified for better legibility and product identification. Lastly, but perhaps the most important, the package has a window of transparent cellulose to make the contents visible. The familiar Beech-Nut blue decorates the carton, with a light band of color around the center giving a modern effect and "spotlighting" the window.

Powdered Mushrooms. Seasoning for soups, gravies and other foods is being distributed in the form of mushroom powder by Sokol & Co., Chicago. This unusual product goes to the general market in 1-oz. tin cans with friction-type closures, these containers being wrapped in yellow-tinted transparent cellulose for added eye-appeal. One dozen tins are packaged together in a carton designed to serve as a display unit at retail outlets. The lid of the carton has a semicircular cut around the top of a mushroom design permitting the "mushroom" to stand up when the lid is folded at the center. Transparent cellulose again enhances the appearance of the package as a wrapper for the carton.

Consumers of large quantities of the mushroom powder, such as hotels, purchase it in 1- and 5-lb. tins.

Vegetable Juice. Pure raw vegetable juices, mixed with fresh fruit juices to make them more tasty, are being bottled as a health beverage by Juice-O-Veg, Inc., New York. No preservatives are added and no heat applied, there being just the extracts of nine fruits and vegetables. The health value comes from the three vitamins, A, B and C, and from the minerals, calcium, iron, potassium, magnesium and silicon.

This "new deal in vitality" which makes people "feel years younger—quickly," looks appetizing and refreshing in the stippled, 16-oz. bottle.

Double Effect. To whet the consumer's appetite, Mrs. L. M. Peterson, New York, packages Swedish style canapé wafers in a window carton wrapped in sealed transparent cellulose. But the designer of the package did not depend upon product display alone to get sales. He went a step farther and decorated the carton with illustrations of canapé wafers covered with tempting tidbits. The illustration shows the result of this double-barreled design.

Packaged Brains. One pound of brains wrapped in transparent cellulose and put up in a pint-size wooden berry basket is an innovation by Wm. Focke & Sons Packing Co., Dayton, Ohio. Six of these packages are put into a pasteboard carton.

By this method of packaging, no hands touch the brains from the time they leave the packing house until they are opened in the consumer's kitchen. The dealer takes no waste nor loss, and the packages give him better display. In Dayton, dealers have been getting 2 cents more per pound for brains in the new containers.

New Lecithin. Among the many things at the Chemical Exposition, was a new product for ice cream manufacturers. Called "Aqualoid," it is a stabilized hydrate of vegetable lecithin developed by A. A. Lund & Associates for Jungmann & Co., Inc., New York. It is credited with being high in efficiency and adaptable to many applications because of its being held in a state of complete molecular dispersion in water.

Practical Problems of
TRUCK TRANSPORTATION

DISCUSSED BY EXECUTIVES IN THE FOOD INDUSTRIES

●

How Best to Provide Salesmen With Cars

Question No. 15

1. Is it best for the company to own the car and pay all the expenses incidental to its operation; to pay only a certain part of the expenses; or to have the salesman own the car and pay him so much per mile or per week?

2. Is the best method also the most economical?

3. If the car is company-owned and maintained, what precaution can be taken to prevent its being used by the salesman for his personal affairs or pleasure?

4. How important do you consider the advertising value of a salesman's car, and how may the greatest advertising value be obtained from it?

Depends Upon Territory

IT SEEMS to be the general consensus of opinion that when a salesman works in a distant territory, a considerable distance from headquarters, it is better for the salesman to own his own car, the company paying him a mileage allowance. But when a salesman works in a nearby territory, it is better for the company to own the car. I think that it is cheaper to operate a company car, than it is to pay a salesman mileage.

We require salesmen to sign a receipt which provides that company-owned cars are not to be used for any other purpose than the company's business, but we know that it is a practical impossibility to enforce this rule 100 per cent.

We think that there is considerable advertising value in a good looking car. However, it must be understood that the car is to be kept clean and in good condition.—A. E. SINCLAIR, *Kingan & Co., Indianapolis, Ind.*

Better to Own Cars

OUR answer to question 1 is that it is most practical for our company to own the automobile and pay all expenses. And the answer to question 2 is that it is the more economical, compared with operating a privately-owned salesmans' car on a per mile basis. As to question 3, we do not take any precaution to prevent the car's being used by the salesman for his personal pleasure. However, he is asked to report the mileage, both for business and pleasure, and we ask him to pay for the personal mileage.

We do not consider that the salesman's car has any advertising value.

Of course, all of the above questions apply to those territories where we have found it to be economical for the company to own the automobile, and in most instances that is not the case. In those territories where the salesman doesn't use an automobile except on a few occasions we make an allowance of 5 cents per mile.—F. H. IRWIN, *Ass't to Vice-President In Charge Of Sales, Kraft-Phenix Cheese Corp., Chicago, Ill.*

Salesmen Own the Cars

ANSWERING your Question No. 15: 1. We prefer to have salesmen own the cars. Usually, the operating expense is taken care of on a mileage basis, but sometimes an allowance is made which is equivalent to the railroad fare between the different points and in other instances a fixed allowance of so much per day is made. There can be no hard and fast rule regarding this.

2. We believe in the end this is the most economical, if it is carried out fairly to both parties.

3. Unless the car is turned in to the company garage every evening, there is no satisfactory method of preventing the salesman from making personal use of the car. If the car is in the hands of a salesman after working hours, he would feel both inconvenienced and annoyed if forbidden to use it in a reasonable way at his own expense for his own purposes.

4. The advertising value of a salesman's car depends upon the character of the business itself. An advertising car is used for advertising purposes, a salesman's car is primarily for transportation. The two may or may not be combined—L. J. SCHUMAKER, *President, American Cone & Pretzel Co., Philadelphia, Pa.*

Next Question

QUESTION NO. 17

Problems of semi-trailer operation

1. Are semi-trailers as safe to operate as conventional trucks?

2. In semi-trailer operation, what parts of the vehicle have required the most servicing?

3. What is the value of streamlining semi-trailer bodies, and how far should streamlining be carried?

• • •

Factors to Consider In Selecting Trailers

Question No. 16

1. What principal factors lead to the choice of trailers (either semi or four-wheeled types) in preference to trucks with two or three axles?

2. What do you consider the minimum load (in tons or cubic feet of volume) at which semi-trailers become preferable to conventional trucks?

3. What factors of operation, other than minimum load, limit the use of semi-trailers for retail food delivery?

4. What effects have road grade and road surfaces upon trailer selection?

5. When does a four-wheel trailer, pulled behind a conventional truck with body and load, become preferable to a tractor semi-trailer hauling the same total payload?

Many Factors Involved

OUR views on questions entering into the selection of trailers and semi-trailers are as follows:

1. The principal factors leading to the selection of trailers in preference to trucks with two or three axles, not necessarily in the order of their importance, are as follows:

(a) Carrying maximum loads within state weight restrictions, where greater loads are permitted on trailers than on trucks.

(b) Shuttle operation; where loading and unloading occupies considerable time in relation to the time in transit.

(c) Increased maneuverability; where a long body on a truck would make it difficult to handle.

(d) For carrying unusually heavy loads not practical on ordinary types of trucks.

2. We do not consider that there is necessarily a minimum load where a semi-trailer would be preferable, as either maneuverability or use for shuttle

work might be the prime consideration. Except for these, the minimum load would depend on the state restrictions limiting the weights of four-wheel trucks.

3. Factors of operation further limiting the use of semi-trailers in retail delivery of food products are difficulty in handling in heavy traffic, parking in congested areas and the usually higher load platform.

In addition to these factors, a properly designed truck should operate more cheaply than a tractor or semi-trailer, provided that the particular advantages of a semi-trailer are not required.

4. Road grades and road surfaces have considerable effect on selection. Slippery surfaces prevent the maintenance of schedules, which can be kept more easily by vehicles having a greater percentage of the total weight on the driving axles. Crowned road surfaces make the operation of a four-wheel trailer extremely difficult and unsafe. If properly powered, so that there is the same ratio of weight per horsepower, road grades will make no difference. Where not properly powered, grades may prove a problem. Accidents are more apt to occur on poor roads with trailers than with trucks.

5. The four-wheeled trailer, pulled behind a conventional truck with body and load, is preferable to a tractor and semi-trailer hauling the same payload only when this total payload is hauled for a small percentage of the time as compared to the possible use of the truck by itself, or where state restrictions make the use of this type of equipment necessary for the desired loads.—M. C. MORRISON, *Assistant Traffic Manager, Dairymen's League Co-Operative Association, Inc., New York, N. Y.*

Trailers for Heavy Hauls

IN REGARD to factors entering into the selection of semi-trailers:

1. We use semi-trailers exclusively—no four-wheelers. We elect to use tractor-semi-trailers in place of the heavier four-wheel trucks primarily where the movement is heavy but slow. If the route to be covered is fast and through congested areas, we revert to the four- or six-wheel type of truck.

2. Our application is of the following order: Using the 1½-ton truck as a base in four-wheel work, we gross at 9,500 lb.; with the six-wheel truck, we gross at 15,000 lb.; with a tractor-semi-trailer, 21,000 lb.

3. We encounter considerable difficulty in the use of tractor-semi-trailer units in small towns where the main streets are narrow or traffic is congested, what with our vehicle blocking a large portion of the street.

4. We refrain as far as possible from using tractor-semi-trailers in mountainous territories, as economy limits tractor-semi-trailer operation to the use of light-duty trucks to move large loads.

5. As mentioned before, we do not recommend the use of four-wheelers, but if we should, it would be for the movement of bulk produce to a remote point. There we would drop the four-wheeler from the truck or tractor-semi-trailer and complete the balance of the run. On the way back, we would possibly transfer the load, complete the deliveries, pick up the four-wheeler empty and bring it on in. In other words, use it only as a means of getting bulk movements out to remote points, these to be distributed later by the same head-end.—F. L. FAULKNER, *Automotive Department, Armour & Co., Chicago, Ill.*

Trailers Reduce Investment

I SHALL try to tell you what our experience with trailers has been:

1. The reason we choose either semi- or four-wheeled trailers in preference to trucks with two or three axles is that, in the first place, we find it more economical. A trailer usually outlasts from one to three trucks if kept in good condition, and when renewing it we have to replace only the truck part. The investment is much lower by having a trailer and a small truck, than by having a big truck with two or three axles. Also, we have never found it satisfactory to operate a truck with tandem axles for our particular hauling.

2. The minimum load at which we consider semi-trailers preferable to conventional trucks is from 5 tons up; *i.e.*, when using 3-ton conventional trucks. On a smaller truck, the minimum load at which a semi-trailer would become preferable is 4 tons.

3. The factor of operation, other than minimum load, for the use of semi-trailers for retail food delivery, is bulky load. There are some products that are too bulky to haul on a conventional truck even though the weight does not exceed that carried by any conventional truck. Therefore, the semi-trailer becomes handy in an operation of this sort.

4. In selecting our trailers, we consider our needs and disregard the road grades or surfaces because 95 per cent of our operations are on roads of very good surface.

5. A four-wheel trailer, pulled behind a conventional truck with body and load, becomes preferable to a tractor semi-trailer hauling the same total payload when all the load carried is not to be delivered to one place. The use of a four-wheel trailer behind a truck with a body and load in our operations is very efficient for long-distance hauling. When we have a load for two different cities on the same route, the four-wheel trailer is dropped at a certain point, and the helper on the truck stays with it and unloads it. The truck goes on to some other city approximately 30 miles distant to deliver its load, coming back and picking up the empty trailer.—R. P. MIRO, *Ballard & Ballard Co., Louisville, Ky.*

Trailers Cheaper to Operate

THE following are in answer to your questions about trailers:

1. The principal reasons why we selected the trailer instead of the two- or three-axle truck are that we can use a smaller motor, and the trailer is cheaper to operate than the ordinary straight truck.

2. The trailer becomes more economical to operate when your load exceeds 2½ or 3 tons, and it is also easier to manipulate than a straight truck.

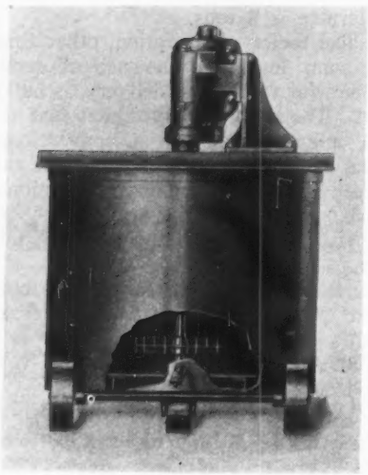
3. We do not consider that it is economical to use the trailer for retail deliveries.

4. We do not believe the road grades and road surfaces would make much difference in the selection of a trailer.

5. We would never care to use a four-wheel trailer, as I think they are fast becoming obsolete. You can now get a two-wheel trailer up to any capacity.—LOUIS R. LIPMAN, *Maintenance Manager, Parkway Baking Co., Philadelphia, Pa.*

Each of these semi-trailers has a capacity of 800 cu.ft. and carries a load of about 16,500 lb. Operated by the Peoria branch of Kroger Grocery & Baking Co., Cincinnati, the fleet is used to haul supplies to stores, principally those in the country.

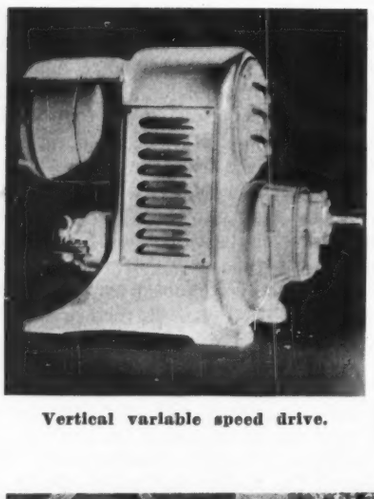
NEW EQUIPMENT
for Food Manufacturers



Portable mixer.

Portable Mixer

A PORTABLE mixer recently was introduced by Patterson Foundry & Machine Co., East Liverpool, Ohio. This unit, with stirrers modified to meet various conditions, is designed to eliminate pumping liquids through pipe lines with attendant pumping and cleaning costs; to stir products in order to prevent skin formation; and to transport perishable products, providing mixing facilities at both ends with only one mixer. This machine is equipped with the "Unipower" agitator, has an extension cord for plugging in, and is provided with truck wheels. It is available in a wide range of sizes and in various metals and alloys.



Vertical variable speed drive.

Variable Speed

THE VARIABLE speed drive made by U.S. Electrical Manufacturing Co., Los Angeles, Calif., and called the "Varidrive" is now made in the upright design shown in the accompanying illustration. This gives a saving in lateral space over the horizontal design, and also gives the user the option of having the take-off shaft at either the high or low position.

Package Delivery Truck

FOR house to house delivery of food products and other packaged merchandise, Stutz Motor Car Company of America, Inc., Indianapolis, Ind., has developed a new model of its truck called the "Pak-Age-Car." It is of the stand-and-drive type, with wide doors and unobstructed floor space. The power unit, comprising the engine and all its accessories, the clutch, the transmission and the final drive, are assembled as a unit together with the rear springs, hubs, wheels, service brakes and tires. This unit is readily removable, and a spare can be substituted. As a result, the truck can be kept in service while the power units are being inspected or overhauled. However, when desired, the unit is easily accessible without removal. The body can be fitted with racks, shelves, or other features suited to the product that is to be carried.

Small delivery truck.

Roller Bearings

A LINE of roller bearing units has been developed by Link-Belt Co., 307 North Michigan Ave., Chicago, Ill., known as the "Shafer Self-Aligning Roller Bearing Series 400." This equipment uses Shafer self-aligning double-row roller bearings in Link-Belt mountings. The units are available for pillow-blocks, flange bearings, hangers and take-ups.

Tiering Truck

TYPE ELN-6 Elevator Truck, with a capacity of 6,000 lb., is a new tiering truck recently introduced by Elwell-Parker Electric Co., Cleveland, Ohio. Powered with either an electric or gas-electric motor, outstanding improvements claimed for this model include: Increased sturdiness of construction; ball-socket steering rods located inside wheel-base; better clearance under truck, giving increased cruising radius; chains instead of cable for hoisting; and rubber vibration-absorbing pads for operator to stand on.

This truck is supplied with either telescoping or non-telescoping uprights. With telescoping uprights, the platform lifts 62½ in. before inner uprights begin to rise. This permits the use of truck in low headroom. Total rise for loaded skid is over 10 ft.

This truck is 41 in. wide and 128 in. long. Platform is 27x54 in. Height of platform in lowest position is 11 in.

Centrifugal Pump

FOR hot well service and for handling liquids near their vapor pressures, as in breweries, a new "Monobloc" centrifugal pump has been announced by Worthington Pump and Machinery Corp., Harrison, N. J. This pump, designated type DH, is available in capacities from 10 gal. per minute against heads of 50 to 110 ft. with 12 in. sub-

mergence, to 175 gal. per minute against 50 to 70 ft. heads with 60 in. submergence. The largest size occupies 24x16 in. floor space. Power varies from 1 to 5 hp., at 3,600 r.p.m. speed.

Motor Trucks

NEW models for 1936, from 1½ to 4 tons capacity, are being marketed by Diamond T Motor Car Co., 4517 W. 26th St., Chicago, Ill. These are powered with the "Hercules" engine used in former Diamond T models, in substantially the same alignment as to size and power with relation to truck models as heretofore. Engines have a four-point rubber mounting, and have been moved forward to a position well over the front axle, giving a greater payload space for a given wheelbase and improving weight distribution. The minimum wheelbase of Models 212A to 228 has been increased from 135⅛ to 139¾ in., and a 9-ft. body can now be used even on the shortest wheelbase. In addition to improved appearance and comfort of this line of trucks, new features for 1936 include stronger frames, wider springs with improved mounting, improved cam and roller steering gear, and refinements in engine design.

Small Scale

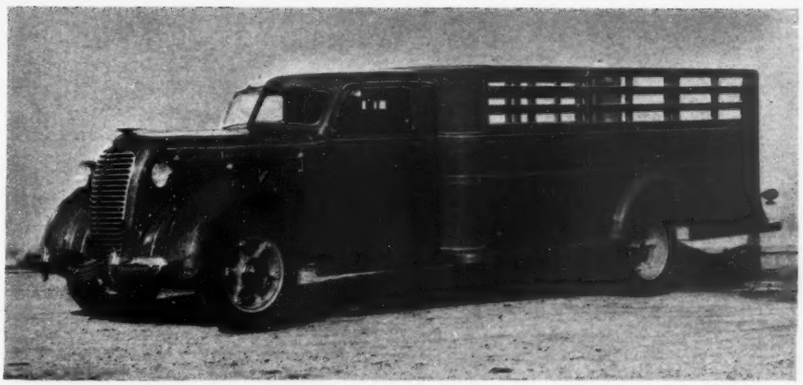
CALLED the "Post-A-Lett," the Exact Weight Scale Co., Columbus, Ohio, has developed a pocket scale, fountain-pen size, for weighing small packages, letters, etc., from ½ oz. to ½ lb.

Density Control

AN automatic density controller, for use in the quality grading of peas, by flotation methods, and also for controlling the density of other brines, pulps, fruit juices, etc., has been developed by E. N. Wood & Co., Aurora, Ill., and is called the "Sal-Wood."

The quality grader consists of a brine-holding flotating receptacle, or separating tank, through which sodium chloride brine of pre-determined density flows or is pumped into a receiving tank, from which it is returned continuously to the separation tank. In pea grading, the washed peas of mixed quality are fed into the separation tank, where those that are tender float away on the surface, while the hard ones sink to the bottom where they are ejected separately. Water is, however, introduced with the incoming peas, causing brine dilution which changes the quality of separation.

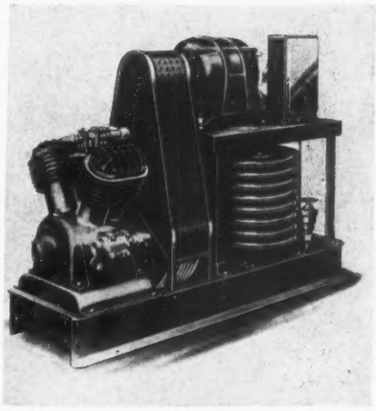
The purpose of the "Sal-Wood" is to automatically hold the density of the brine at the point which gives the desired separation. It is essentially a scale beam, in which a portion of the circulating brine is continuously weighted at one end of the beam, against a fixed weight at the other end. If the beam becomes unbalanced, it indicates that the brine strength has changed, and automatically causes a valve to open and feed in strong reinforcing brine sufficient to make the beam balance again.



Diamond T truck for 1936.

Refrigerating Units

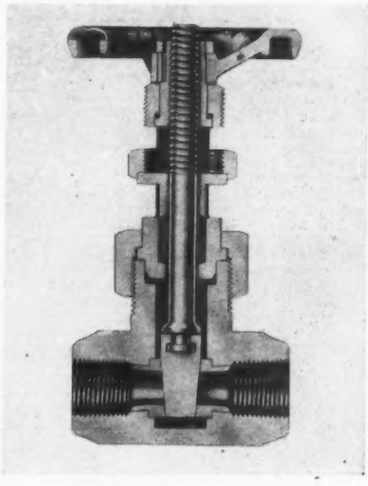
Two new Freon refrigerating units, designed especially for the needs of air conditioning and water cooling, have been developed by Frick Company, Waynesboro, Pa. These are in 15-ton and 20-ton capacities; the first having three vertical cylinders and a 15 hp. motor, the second four cylinders arranged in a V and a 20 hp. motor. The capacities are based on a suction temperature of 40 deg. F.



Twenty-ton Freon refrigerating unit.

Gate Valve

MACHINED from solid steel bar stock, a new gate valve brought out by Chapman Valve Mfg. Co., Indian Orchard, Mass., carries a five-year guarantee. This valve, list No. 960, comes in standard sizes from ¼ to 2 in. It is designed for all services up to 600 lb. per sq.in. pressure at 800 deg. F. Sizes from ¼ to 1 in. are designed for cold working pressures up to 2,500 lb. per sq.in.; larger sizes for 1,500 lb. per sq.in. For corrosive service, this valve is supplied in Monel metal, stainless steel and other special alloys.



Guaranteed gate valve.

Worm-Geared Reducer

ANNOUNCEMENT is made by Link-Belt Co., 307 North Michigan Ave., Chicago, Ill., of a new line of cut-tooth, worm-geared speed reducers. These are available in a wide range of ratios and capacities, with single or double reduction, and in horizontal and vertical types. All have tapered roller bearings, automatic lubrication and dustproof gray iron castings. Output shafts can be located above or below input shafts in the horizontal models, as desired.

International Trucks

NEW additions to the line of motor trucks manufactured by International Harvester Co., 606 So. Michigan Ave., Chicago, Ill., include three models featuring two-speed axle construction providing eight forward and two reverse speeds. These are Model CS-30, in 133 and 157 in. wheelbases; Model CS-35, in 136, 160 and 175 in. wheelbases; and Model CS-35-T, a six-wheeled model, in 168 and 180 in. wheelbases. The first of these has a motor developing 78.5 brake hp. at 3,400 r.p.m., while the other two are powered with a 78 brake hp. motor at 3,400 r.p.m.

In addition to the six-wheeled truck just mentioned, this company has also brought out several other six-wheeled models, as follows: (Letter T indicates trailing-axle type, and letter F indicates dual-drive type.) The 1½ to 4 ton

Models C-35-T and CS-35-T, each available in two wheelbases—168 and 186 in. The 2 to 5 ton Models C-45-T and C-40-F, in 168, 186 and 204 in. wheelbases. The 3 to 6 ton Model C-50-T, in 170, 188 and 206 in. wheelbases. The 3½ to 7 ton Models C-55-T C-55-F and C-60-T, in 170, 206 and 224 in. wheelbases.

Unit Heaters

THE FEDDERS MANUFACTURING CO., Buffalo, N. Y., has added seven sizes to its line of Series 3 unit heaters, making twenty standard models available, in capacities up to 1,300 EDR.

Thermometer Improvement

SEPARABLE wells are required on many temperature measuring and control applications to protect the thermometer bulb, to support it adequately, or to permit its removal without interruption to processing. The resulting extra thickness of metal and the dead air space between the well and the bulb, cause delays or lags in transmitting temperature changes to the bulb.

To overcome this lag, Taylor Instrument Companies, Rochester, N. Y., have introduced a perfected separable well tube system, known as the "Thermospeed," said to have a speed of response closely approaching that of a bare bulb, about six times faster than with the separable well tube system formerly used, and almost twice as fast as separable well thermocouples.

Bottle Wrapping Machine

FLAT bottles of many types can be wrapped on a new machine recently developed by Miller Wrapping & Sealing Machine Co., 18 South Clinton Street, Chicago, Ill. This machine is adjustable for both size and type of bottle handled. Its capacity varies from 600 to 900 bottles per hour, depending upon ease with which bottles can be handled and the skill of the operator. Wrapping material of the type of pliable, heat-sealing papers or cellulose are used. Floor space occupied is about 4x5 ft., without extension tables erected.

Small Homogenizer

FOR USE on milk, cream, ice cream mix, sour cream, buttermilk, and chocolate milk, Dodge Emulsor Corporation, Donovan Bldg., Detroit, Mich., has brought out the Hayes "Emulsor." Made of Waukesha metal, this device has a capacity of 100-180 gal. per hour, and operates at pressures from 100 to 500 lb. per sq. in. A 2-hp. motor is used for the power supply.

The Manufacturers Offer . . .

Refrigerating Equipment—Three new bulletins of Frick Company, Waynesboro, Pa., as follows: Bulletin No. 98-A, announcing and describing two new low-pressure refrigeration units with overhead drive; Bulletin No. 156-A, giving specifications and descriptions of Type VW coils for refrigeration insulation; Bulletin No. 203-C, giving specifications and descriptions of electrical control valves for refrigeration systems.

Fan Bearings—A bulletin issued by SKF Industries, Inc., Front St. & Erie Ave., Philadelphia, Pa., discusses the use of ball bearings in place of plain bearings for replacing bearings in existing installations.

Paint—In a bulletin prepared in cooperation with the Better Vision Institute and the Better Light-Better Sight Council, Sherwin-Williams Co., Cleveland, Ohio, discussed the part which painting plays in the proper lighting of a manufacturing plant.

Steam Equipment—Catalog No. 35, American District Steam Co., North Tonawanda, N. Y., is a loose-leaf book of 130 pages, giving data on this company's line of traps, meters, expansion joints and other steam equipment.

Nickel-clad Steel—Catalog No. 18-AB, Lukens Steel Company, Coatesville, Pa., describes the properties, characteristics and applications in food manufacture and other fields of the nickel-clad steel made by this company.

Packaging—"Packaging Work Book" has been issued by Pneumatic Scale Corp., Ltd., Norfolk Downs, Quincy, Mass. This book contains practical information on package types and packaging machinery; and displays samples of many types of paper, paperboard, parchment, transparent wrappings and paper-backed foil.

Wiring Equipment—Crouse-Hinds Co., Syracuse, N. Y., has issued a new general catalog of their complete line of "Condulets" and other electro wiring equipment and accessories.

Pumping Equipment—Several new bulletins of Worthington Pump & Machinery Corp., Harrison, N. J., as follows: W-101-B1A, describing horizontal duplex piston pumps for general service, Type VC; W-101-B2A, bulletin describing horizontal duplex piston pumps for general service, Type VA; W-321-B7, bulletin describing open impeller type centrifugal pumps, Types DK, DL, and DM; W-450-B24 and W-450-B27, two bulletins describing deep-well turbine pumps for water supply.

Refrigeration Calculations — Westinghouse Electrical & Mfg. Co., East Pittsburgh, Pa., is now distributing a device called the Simplograph, a special slide rule for calculating and selecting refrigerating equipment.

Feed Water Heaters—Bulletin W-210-B17, issued by Worthington Pump & Machinery Corp., Harrison, N. J., describes deaerating feed water heaters.

V-Belt Drives—"Emerald Cord" V-belts for driving machinery from motors in multiple-belt drives are described by Worthington Pump & Machinery Corporation, Harrison, N. J., in bulletin L-400-B7.

Refrigeration Compressors — Carbondale Machine Corp., Harrison, N. J., in Bulletins 1101 and 1108, describes horizontal duplex and vertical duplex types of refrigeration compressors.

Steam Turbines—Small steam turbines for the mechanical drive of pumps, fans, compressors, blowers, pulverizers and similar equipment are described in Bulletin GEA-1145C by General Electric Company, Schenectady, N. Y.

Synchronous Motors—Type TS and QS, 7,500 series, high speed synchronous motors are described by General Electric Company, Schenectady, N. Y., in Bulletin GEA-246D.

Materials Handling Equipment—Two catalogs have been issued by Jeffrey Mfg. Co., Columbus, Ohio, as follows: No. 417, new general catalog of 400 pages, giving specifications and descriptions of the general line of conveying equipment manufactured by this company; No. 610, 64-page catalog describing electrical vibrating types of material handling equipment made by this company under the name of Jeffrey-Traylor.

Filter Aid—Dicalite Company, 20 Exchange Place, New York, N. Y., have issued a booklet discussing diatomaceous silica and its use for filtering and other industrial purposes such as insulation.

Boilers and Stokers—Two bulletins of Combustion Engineering Co., Inc., 200 Madison Ave., New York, as follows: A bulletin describing sectional header type boilers for a wide range of steam pressures, capacities and different methods of fuel firing. A bulletin describing Coxe stokers for burning small sizes of anthracite, coke breeze and lignite.

Filler and Sealer—A folder describing and illustrating the "Neverstop" carton sealer for filling by gross weight, net weight or volume, made by Stokes & Smith Co., 4919 Summerdale Ave., Philadelphia, Pa.

Electrical Instruments—Broadside E 250-1235, issued by Leeds & Northrup Co., 4902 Stenton Ave., Philadelphia, Pa., lists and describes electrical measuring instruments for research and testing.

Optical Instruments—A bulletin issued by Bausch & Lomb Optical Co., Rochester, N. Y., describes saccarimeters of the half-shadow type with International Sugar Scale.

Lubrication — Alemite Division, Stewart-Warner Corp., 1378 Diversey Parkway, Chicago, Ill., has issued an "Industrial Lubrication Reference Manual" giving recommendations for the lubrication of all types of industrial machinery.

Lighting — A 28-page bulletin issued by Benjamin Electric Manufacturing Co., Des Plaines, Ill., describes high intensity mercury vapor lamp lighting fixtures and their installations.

Laboratory Glassware—Kimble Glass Co., Vineland, N. J., has issued a 16-page catalog of Normax precision-graduated laboratory glassware.

Industrial Exhibits—The Exhibitors Advisory Council, Inc., C. E. Sullivan, The Foxboro Co., Foxboro, Mass., secretary, has issued a catalog of important industrial, trade, professional and other types of shows and exhibits to be held in 1936.

Arc Welding—A revised and enlarged edition of the "Procedure Handbook of Arc Welding Design and Practice" is announced by the Lincoln Electric Company, Cleveland, Ohio, as a complete discussion of this procedure, illustrated with more than 700 drawings and photographs.

Roofing—"Facts about Built-Up Roofs" is the title of a bulletin published by Johns-Manville, 22 East 40th St., New York, N. Y.

Rubber Substitute—Koroseal, a new rubber-like material made in a variety of compounds ranging from bone hardness to liquid, is described in a bulletin of the B. F. Goodrich Co., Akron, Ohio.

Control Instruments—The Brown Instrument Co., Philadelphia, Pa., has issued a folder which illustrates and briefly describes the features of their air-operated controllers for industrial process control.

Paper Bags—Bagpak, Inc., 220 East 42d St., New York, N. Y., a division of the International Paper Products Co., has issued a booklet describing paper bags as shipping containers for various products.

Pneumatic Tubes—A catalog of pneumatic tube transportation for factories and offices has been issued by the Lamson Co., Inc., Syracuse, N. Y.

Laboratory Equipment—Electrically heated laboratory apparatus such as hotplates and furnaces, are described in leaflet TB-23, by Harold E. Trent Co., 618 North 54th St., Philadelphia, Pa.

Nickel Cast Iron—Section 3, No. 6, Nickel Cast Iron Data, dealing with the thermal expansion characteristics of nickel cast iron, has been issued by the International Nickel Company, Inc., 67 Wall Street, New York, N. Y.

The PLANT NOTEBOOK

Five dollars will be paid for brief stories which are suitable for use in this department. Sketches or photos should be provided whenever possible.

Re-Conditioning Conveyor Chains

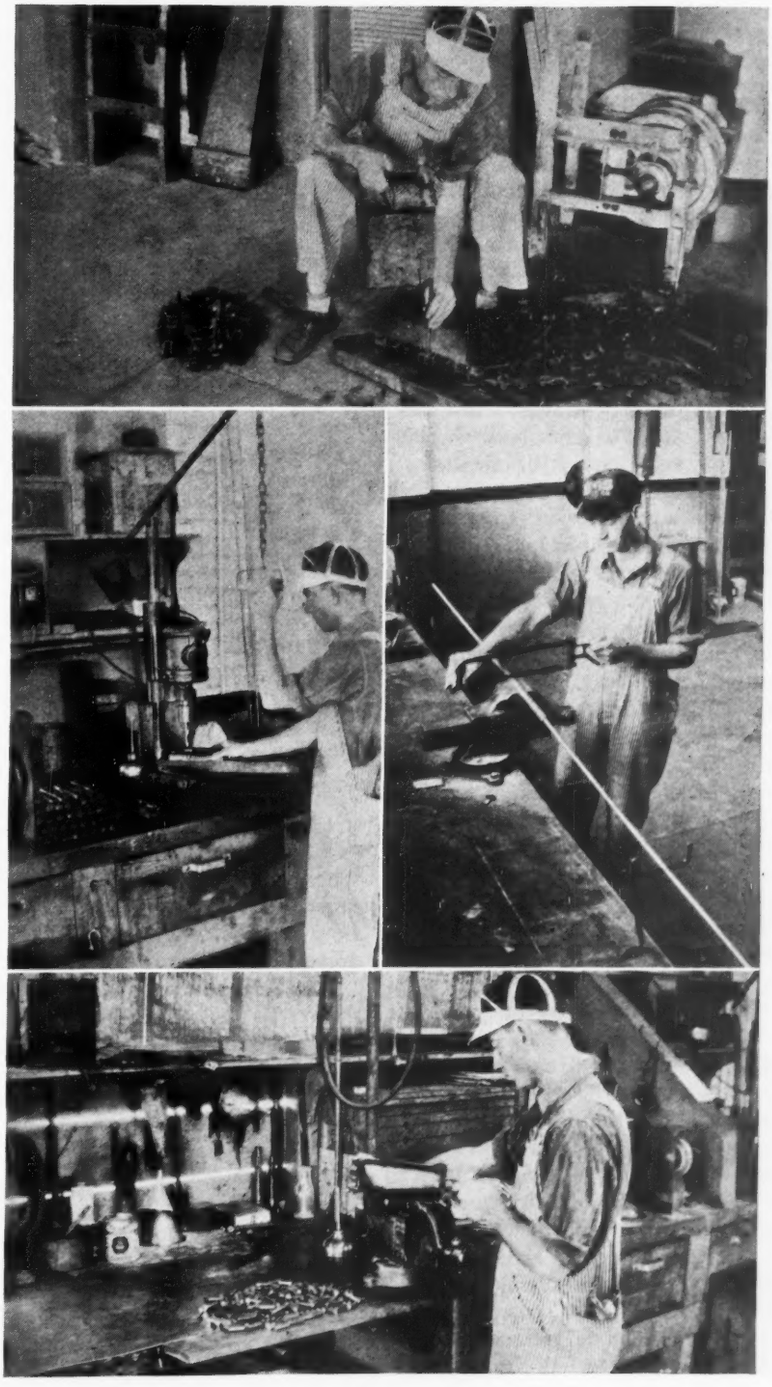
IT PAYS to recondition conveyor chains in the plant shop, and when it is properly done, the renewed chain should have as long or longer life than the new equipment. For example, an original chain with $\frac{3}{8}$-in. diameter rivets lasted for seven years. I think that ten years is a conservative estimate for the life of the reconditioned chain, which now has $\frac{1}{2}$-in. diameter rivets.

The necessity for reconditioning becomes evident when you find tightness, looseness, and slipping with unsatisfactory take-up, all in one chain. My procedure for overcoming this trouble is to replace the worn rivets with new over-size rivets. This is generally effective, because the chain links themselves will usually be found to be in good condition. Incidentally, it is well to have on hand an extra chain equal in length to the longest stretch, in order to keep conveyors in operation while re-conditioning is under way.

All the rivets in the chain should be replaced with the same over-size rivets. Should rivets of varying diameters be used, the wear will be uneven, and difficulties in sprocket conformity and take-up will result.

The re-conditioning job entails disassembling the links, re-drilling rivet holes, marking and cutting rivets, and re-riveting.

With hammer and punch, the chain is disassembled on the cast iron block (in this case, a door weight), shown at top. Holes in the block receive the old rivets until all holes are filled, when the block is lifted, the old rivets



Top: Removing worn rivets from conveyor chain. Center, left: Re-drilling worn and elongated holes in conveyor chain links. Center, right: Marking rod for rivets, showing jig and rod support. Bottom: Sawing rivets out of cold-rolled rod.

brushed aside, and the sequence repeated.

After the links are separated, the worn, or elongated, holes must next be re-drilled in order to true them up. An excellent jig for this re-drilling job can be made from two short strips of 1x1-in. wood, spaced the thickness of a chain link apart, and nailed to a 2x4-in. block. Holding links in this jig while drilling, as shown left center, is both easier and faster than using a drill vise or wrench to hold them. If the cutting face of the drill bit is ground slightly flat and a little oil is used on it, it will not hook, or drill out of round.

Sheared or snipped rivets are not easily assembled and for that reason only saw-cut rivets are used. Rivet stock of cold-rolled steel is used. To mark it, construct a jig of ½-in. extra heavy black iron pipe. In this cut ten slots, equally spaced, a rivet-length apart. The slots are cut one-third the pipe diameter in depth. Rivets should be cut ⅛ in. longer than the link width, to allow $\frac{1}{16}$ in. on either side for riveting.

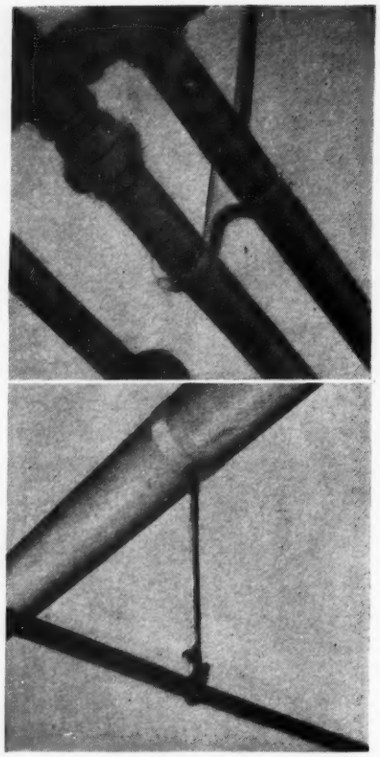
At right center this method of marking is shown. The pipe jig is held in a vise, with the slots above. The stock rod from which rivets are to be cut is inserted in it, even with one end of jig. A hacksaw, passed through each slot, starts a cut, measures the rivets, and marks them all, in one operation. When the ten marks have been made, the rod is slid through the pipe until the last cut mark is even with the pipe end, and the marking operation is repeated.

In conjunction with the marking, a vise aid for limber steel, as shown in the photo, is used to support the rod. This is made of ½-in. diameter rod, shaped so that the supporting perch is even with the vise jaws. The base rests on the bench with the foot inserted in a hole.

When sawing these marked rivets from the rod, as shown at bottom, the vise should be re-set for each cut in order to get the best results. A little oil on the saw blade helps, and also lengthens the blade life at least 3 to 1. Looking across the vise jaws while sawing helps to guide the saw and gives a good, square cut. After cutting, each rivet is slightly chamfered on one end at the emery wheel.

As a result of the operations outlined, there are now available links with clean, round holes and good-fitting rivets. The chain can be quickly re-assembled on the cast iron block. Experience has shown that it is best to make up the chain in four to six-foot lengths and then join these pieces together. This avoids the unwieldy turning job that ensues when one link at a time is added to a longer piece.

In this way, I have re-conditioned 600 ft. of chain at a cost for labor and material of about $165. New chain of this type costs around $1 per foot plus freight.—Billie Burgan, *San Diego, Calif.*



Upper: Support for two pipes under skylight. Lower: Support for demountable pipe, with universal joint.

The PLANT NOTEBOOK

Supporting Pipes

OFTEN it is necessary to locate pipes in places not contemplated when the plant was built. Two jobs recently done in this plant indicate how some of these problems can be solved.

One of these involved supporting two pipes beneath a skylight and directly above a pasteurizer. These pipes come from the water tank on the roof and carry water to the water cooler and process room. The illustration shows the method followed: A dual hook was made of ½x1-in. channel iron, being shaped and welded with an oxy-acetylene torch. This hook was suspended from the wall of the skylight and made a satisfactory installation.

In the other case, a new pipe was passed beneath a steam main, at right angles. This pipe had to be removable, so a regular sanitary line hook was suspended on a small universal joint at the upper end. The joint is made of two hex nuts, linked together with a ¼-in. rod bent into a half circle and welded. One nut screws onto a support stud and the other onto the hanger rod. With this arrangement it is possible for one operator to take down or put up the pipe without cramping either the pipe or the hanger.—Carl Richards, *Chicago, Ill.*

Lighting with Mirrors

OCCASIONALLY it is necessary to secure additional illumination on some spot, such as the face of an instrument located in a position where it is inconvenient or undesirable to install an electric lamp. In such cases, the illumination can be obtained by a mirror located in a well-lighted spot and so mounted that it reflects a beam of light on the instrument.

Vermin Proofing

WHILE the outstanding reason for using prepared board of the asbestos-cement combination type is the fireproofing of various rooms and structures, there is another reason for using it in many places where fire threatens but little. This is the fact that the ravages of rats and vermin may be quite effectively stopped by the careful application and fitting of this type of material. To exclude the smaller kinds of pests, it is of course needful to join and fit the material very closely; but any handy man can do this if care is used, with no more complicated tools than a hammer and a handsaw.

The material is naturally hard on a handsaw, however, and it must be admitted that much better results can be obtained and far better headway made if and when a portable electric handsaw is used for the purpose, especially if the tool is equipped with one of the special blades now available, having the saw teeth tipped with a very hard cutting alloy.—J. E. Hyler, *Peoria, Ill.*

Books Received

THEORY AND PRACTICE OF ICE CREAM MAKING. SECOND EDITION. By Hugo H. Sommer. Professor Dairy Industry, University of Wisconsin. Published by author, Madison, Wis. 1935. 639 pp. 6½x9¼ in., cloth, illustrated. Price $5.75.

As a manual for the commercial ice cream maker, a reference book for the research worker, and a textbook on the science of ice cream making this volume is the most comprehensive treatise on ice cream that has come to our attention.

Need for such an embracive treatment of the subject was evidenced by the quickness with which the available supply of the first edition, published 1932, was exhausted. To the contents of the first edition have been added experimental data, which has subsequently become available, and a chapter on the bacteriology of ice cream a factor in ice cream making that has become of increasing interest as various states and cities set up regulations covering the bacterial count to be tolerated in ice cream sold in their trade areas.

Not only is ice cream and its making discussed in an exhaustive manner as to composition, preparation, and handling of mix but so also are the materials, even flavoring materials, and equipment used in its making and marketing. The science and economics of its manufacture and merchandising are also dwelt upon. Of further interest is a 43-page Appendix giving recipes, chemical and physical tests, and miscellaneous tables of useful information and data.

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Miscellaneous Publications

TRAINING SUPERVISORS AND KEY MEN. Prepared and published by Policyholders Service Bureau, Group Insurance Division, Metropolitan Life Insurance Co., 1 Madison Ave., New York, N. Y. 1935. 45 pp. 8½x11 in.; paper. Free.

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INTRODUCTION OF NEW CONSUMER PRODUCTS. Check Sheet, Market Research Series No. 7, including a list of government sources of market research material published by Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce, Washington, D. C. 1935. 51 pp., 8x10½ in., paper. Price 5 cents. Superintendent of Documents, Washington, D. C.

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CONTROLLING COSTS AND OPERATION OF BUSINESS AUTOMOBILES. Prepared and published by Policyholders Service Bureau, Metropolitan Life Insurance Co., 1 Madison Ave., New York, N. Y. 1935. 34 pp., 8½x11 in., paper. Free.

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OPERATING EXPENSES OF 110 SELECTED FOOD STORES. Published by The Progressive Grocer, 161 Sixth Ave., New York, N. Y. 1935. 44 pp., 5x8 in., paper. Price 50 cents.

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REPORT OF THE FOOD INVESTIGATION BOARD FOR THE YEAR 1934. Department of Scientific and Industrial Research bulletin published by His Majesty's Stationery Office, London. 1935. 261 pp., 6x9¾ in., paper, illustrated. Price $1.25. Obtainable from British Library of Information, 270 Madison Ave., New York, N. Y.

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MODERN FOOD MERCHANDISING, 3RD EDITION (revised and enlarged). Published by C. V. Hill & Co., Inc., Trenton, N. J. 1935. 216 pp. 6¼x9¼ in., cloth, illustrated. Price $2.50.

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REPORT OF PROCEEDINGS OF 35TH ANNUAL CONVENTION OF INTERNATIONAL ASSOCIATION OF ICE CREAM MANUFACTURERS, VOL. 2. PRODUCTION AND LABORATORY COUNCIL. Published by International Association of Ice Cream Manufacturers, Washington, D. C. 1936. 105 pp., 6x9 in., paper, illustrated. Price, 50 cents. Available to members of association.

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THE SCIENCE AND ROMANCE OF FOOD MANUFACTURE. Compilation of Speeches made before 27th Annual—Nov. 14, 1935—A.G.M.A. Convention. Published by Associated Grocery Manufacturers of America, Inc., 205 East 42d St., New York, N. Y. 1935. 45 pp., 6x9 in., paper. Free.

Pea Blanching

(Continued from page 112)

An exhaust of three or four minutes appears to be ample. As the can emerges from the exhaust box, it is inverted and drained, then righted and refilled with brine and the lid seamed on. It is then ready for the usual sterilizing process. The advantage of filling a raw product directly into the can with no necessity of again handling it before the can is sealed is obvious.

The can is inverted automatically by a tipping machine as the cans proceed down the line. As each can enters the tipper, it is clamped down to its base by an arm which also covers the can with a screen of suitable mesh. The can is then quickly turned upside down, causing the water in the bottom of the can thoroughly to flush out any particles of scum that form when raw peas are heated in water. After allowing a very few seconds for draining, the can is righted and goes back on the line ready to be brined and closed.

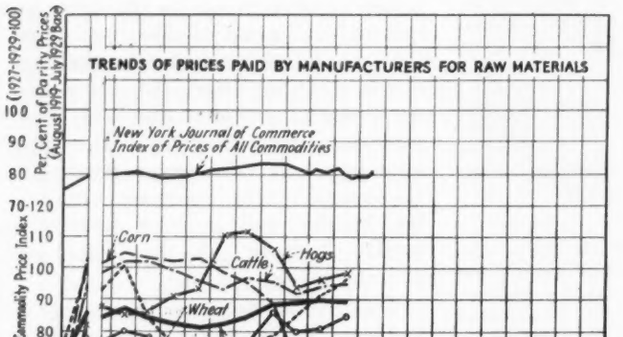
The above procedure has a distinct cleansing effect, both as regards any foreign matter adhering to the peas, such as vine juice or weed juice, and also as regards bacteria which cause spoilage. Each can of peas receives its allotted portion of fresh water and hence greater uniformity is possible. The first can that goes down the line may be given exactly the same treatment with respect to the hot water to which it is subjected as any can later in the day after any period of operation. As the water in each can is heated in the process, its cleansing effect is increased. Because of this cleansing effect, the cold water spray that is now necessary with peas emerging from the blancher is unnecessary. A cold water treatment of blanched peas does not improve the quality and is now necessary merely because of the blanching process in use.

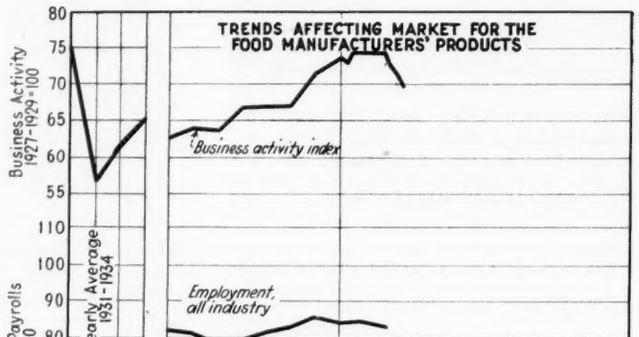
Since it is unnecessary to handle the peas after blanching in such a system, there is little possibility for peas being broken or loose skins showing up. This is of distinct advantage because of the greater mechanical ease with which broken peas may be removed while the peas are still raw. Since loose skins always tend to appear on the top of the can or dish into which they are poured, even one loose skin has an unwarranted effect on the appearance of canned peas.

The several sizes of peas as well as different varieties and different qualities make it necessary for every canner to handle a rather large assortment each day. It is impractical to change from one lot to another except at given intervals. Each change means a loss of more or less time since the line must be cleared. As a result, small lots frequently must wait unduly until their turn comes. These small lots may be of high quality and the waiting is of course detrimental to this quality. The procedure just described makes it possible to change from one lot to another with scarcely more interval than is necessary to place a can marker in the line. No time is lost and no lot of peas needs to wait unduly.

It would be too optimistic to present this as a blanket recommendation for a process to be immediately adopted. It deserves further experimental study. The fundamental principles that it involves seem so simple and obvious that they need no advocate. Our interest lies in these fundamental principles and not the particular mechanism we used to apply them. The most readily available and simple mechanical device to accomplish them was employed. Improvements along this line are welcomed and will undoubtedly be forthcoming.

BUSINESS TRENDS


TRENDS OF PRICES PAID BY MANUFACTURERS FOR RAW MATERIALS
New York Journal of Commerce Commodity Price Index (1927-1929=100)
Per Cent of Parity Prices (August 1909-July 1929 Base)
New York Journal of Commerce Index of Prices of All Commodities
Corn
Cattle
Hogs
Wheat
Butterfat
Ratio of all prices received to prices paid
1935
1936



Canned Foods Stocks

FIGURES recently released by the Bureau of Foreign and Domestic Commerce give the canned food stocks in the hands of representative canners and distributors on Jan. 1, 1936, as compared to the stocks held by the same concerns one year ago. These figures are for only six of the important fruits and vegetables, and they do not cover, by any means, the whole of the industry. However, both products listed and firms supplying the data are sufficiently representative of the industry as a whole, to give the figure validity as showing the present trend in the field.

Stocks of Six Canned Foods in the Hands of Canners and Distributors

Food	Stock of Canners—Cases, all sizes, sold and unsold Jan. 1, 1936	Jan. 1, 1935
Peas	7,067,479	2,052,873
Corn	6,469,450	2,356,055
Tomatoes	3,764,415	3,024,712
Green and Wax Beans	1,808,929	1,703,970
Peaches	5,046,234	3,316,166
Pears	2,210,986	2,186,932
	Stocks of Distributors—Cases, all sizes	
Peas	1,349,614	1,361,617
Corn	1,259,102	1,288,730
Tomatoes	1,497,878	1,522,098
Green and Waxed Beans	511,897	629,098
Peaches	664,921	844,138
Pears	249,693	299,819

Butter Supply Short

DURING most of February, the price of butter in the United States was high and the spread between that price and the price on the London market of butter from New Zealand and several other countries was more than the 14-cent duty. As a result, the movement of butter from New Zealand that commenced in January was continued through the month, and the imported supply was augmented by some shipments from Latvia and the Argentine.

Unusually cold and stormy weather in the Northeastern and North Central parts of the United States, cut down the domestic supply during February to such a degree that the price of butter held firm at prices above the import level, in spite of these foreign receipts. All butter that came to market, whether of domestic or foreign origin, found a ready sale, and at that the supply was somewhat below the country's normal needs.

Butter production during 1935, in spite of below-normal cream output in the last three months of the year, was 1,633,751,000 lb., only 61,000,000 lb. below the production of 1934. Butter in storage the first of February stood at 18,907,000 lb., 3,000,000 lb. below the figure for the same month of 1935, and only half the figure for the five-year average.

Construction News

	Pending (thousands)	Awarded February (thousands)	Total Awarded 1936 (thousands)
Bakery	$100	$345	$695
Beverages	359	622	1,255
Canning and Preserving	688	....	....
Confectionery	....	....	....
Grain Mill Products	654	37	142
Ice Manufactured	....	50	187
Meats and Meat Products	221	50	241
Milk Products	111	102	266
Miscellaneous	189	....	147
	$2,322	$1,206	$2,933

Apparently, however, this situation is only temporary. Increases are expected in the milk flow this spring, and, with the advent of somewhat warmer weather and fresh pasturage, the butter supply should soon become sufficiently ample to lower the price below the import point and to fill all domestic needs.

Fish Still Plentiful

CONTINUING the experience of 1935, fish supplies remain ample, as shown by figures released for January, 1936, by the Bureau of Fisheries. While cold storage holdings were 1 per cent below January, 1935, they were 11 per cent over the five-year average. The quantity held was 63,762,000 lbs. Fish frozen during the month ending Jan. 15, 1936, was 4,985,000 lb., compared to 3,945,000 lb. for the same month of the previous year.

Fish Imports Increase

JAPAN has been exporting more canned and frozen fish to the United States in recent years. Significant of this development are the figures for canned and frozen tuna. While imports of fresh tuna are not of great importance, averaging about 1,000,000 lb. annually, or less than 2 per cent of the domestic catch, the frozen product, coming exclusively from Japan, has been taken in increasing quantities. The total imported now equals about 5,000,000 lb. per year, or about 7 per cent of the domestic catch. This frozen tuna is canned by American canneries, and consists mostly of albacore, or white-meat

tuna, which is preferred by many to the yellowfin tuna that constitutes most of the American catch.

By far the greatest imports of tuna are in the canned form, however, and most of this is supplied by Japan. Taken together, the frozen and canned tuna imports now equal 27 per cent of the domestic consumption.

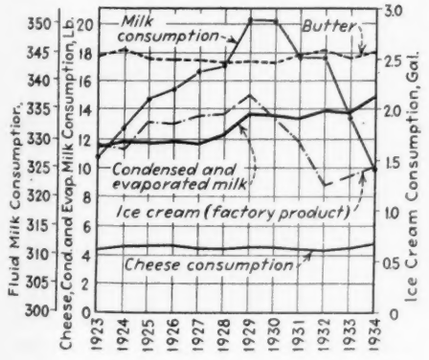
This import situation is, however, not as serious as might at first appear for the reason that domestic consumption has been rapidly increasing, while the American catch is increasing very slowly. Also, the fishing boats find it necessary to make longer trips each year in order to find the fish, and now are regularly going as far as the Galapagos Islands, some 2,500 miles from California.

Another fish product in which Japanese exports are increasing is frozen swordfish. While landings of "domestic" swordfish at Boston, constituting four-fifths of the domestic production, have decreased from 1,337,000 lb. in 1929 to 395,000 lb. in 1934, imports of frozen Japanese swordfish have risen from 305,000 lb. in 1930 to 1,561,000 lb. in 1934.

Co-operative Canning

ESTABLISHMENT and operation of co-operative canning plants would seem to be on the increase in many sections of the country. Rumors of activities of this nature have circulated concerning milk canning plants in Wisconsin and Washington, vegetable canning plants in Indiana and other Midwest states, fruit canning plants in Washington and Oregon, and fruits and vegetables plants in several states in the South. Activities of this nature in the South have undoubtedly been encouraged by the recent restrictions on cotton planting.

One indication of what is under way is given by a report from Alabama. According to this statement, there are four co-operative canneries now in operation in that state and another which may be placed in operation from time to time during the year. It is expected that approximately 5,000,000 No. 2 cans will be packed. The pack will consist of stringless beans, okra, beets, field corn, lima beans, sweet potatoes, kraut and cane syrup.



Per cent of parity prices are from the U. S. Department of Agriculture. Employment, payrolls, wholesale prices and retail prices from the U. S. Department of Labor. The business activity index is that of *The Business Week*. The cost of living index is from the National Industrial Conference Board. Data for milk products consumption is from the U. S. Department of Agriculture.

Business Declines

AS INDICATED by the *Business Week* index for the month ending February 15, general business activity paralleled its movement of a year ago. At 69.4 per cent of "normal" it has declined 6.85 per cent.

Exceptionally adverse weather conditions throughout the northern half of the United States east of the Rocky Mountains, industrial strikes, and the continued unsettled state of Europe contributed heavily to this decline. Snowbound highways and railroads, and below-zero temperatures, interfered with the production as well as the movement of supplies, giving rise to an advance in commodity prices, particularly in dairy and fresh fruit and vegetable foods. Temporary shortage of these foods increased the demand for and strengthened the prices of canned goods.

As reported by the U. S. Department of Labor, wholesale prices for all commodities advanced 0.50 per cent for the month ending February 15; those for farm products rose 2.30 per cent while those for food as a group were 1.33 per cent higher. For the month ending February 22 the New York *Journal of Commerce* general index of weighted prices bounded upward by 1.50 per cent; grains slumped 1.07 per cent and foods jumped 4.87 per cent higher.

Confectionery Improves

RESULTS of the 1935 season in the confectionery trade are now available and show an 8 per cent improvement over the sales in 1934. Increases in confectionery have closely paralled the rise out of the depths of the depression and a continuation of this rising trend is looked for during the remainder of 1936.

Actual sales of confectionery and competitive chocolate products in 1935 were $218,590,375 compared to $201,676,661 in 1934. This increase of 8.4 compares to an increase of 14.3 per cent in 1934 over 1933.

The trend which has marked the confectionery field for several years continues, in that competitive chocolate products show a relatively greater increase than do other confectionery products. In 1935, these chocolate products showed increased sales of 16.4 per cent, while in 1934 the sales of the same products increased 37.8 per cent over 1933.

Indicators

TOMATO PACK for 1935, in cases, all sizes, is reported by the National Canners Association to have been approximately 24,289,543.

TOMATO JUICE PACK, actual cases for 1935, numbered 8,170,640, which compares with a pack of 5,703,920 cases in 1934, according to the National Canners Association.

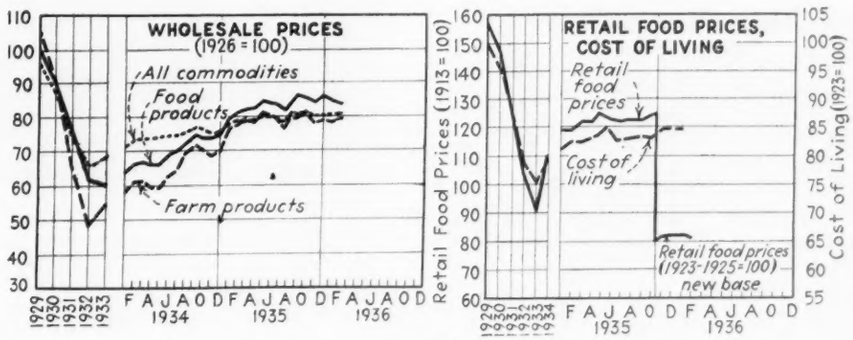
TOMATO PULP AND PUREE PACKED in 1935, as reported by the National Canners Association, totaled 2,751,721 actual cases, compared to 2,449,859 cases in 1934.

GRAPEFRUIT production trends, according to the Bureau of Agricultural Economics, are definitely upward, and crops in the United States of more than 20,000,000 boxes are likely to occur frequently in the next few years, which should have the result of keeping prices well below the pre-depression level. Reports of the result of the recent frosts in the Rio Grande valley are not yet available, however.

CATTLE AND CALVES on farms, Jan. 1, 1936, were estimated by the Crop Reporting Board at 68,213,000 head, compared to 68,529,000 head for the same date in 1935.

MILK cows on farms on Jan. 1, 1936, numbered 25,622,000 head, according to the Crop Reporting Board, compared to 26,236,000 head a year ago.

HOGS on farms, Jan. 1, 1936, were estimated by the Crop Reporting Board to number 42,541,000 head, compared to 39,004,000 head on Jan. 1, 1935.



In the Current of Events

- *Soil-conservation substitute for AAAct goes through*
- *Congress will not act on Copeland food and drug bill*
- *Supreme Court approves 1c price differential on milk*
- *Vintners look to FAA regulations to stabilize trade*
- *New York exposition to cover all phases of packaging*

AAA Substitute Passes

SPURRED ON by a desire to end the session early, Congress got busy on its "must" legislation last month and put the administration's soil-conservation plan through both houses. Although it operates indirectly, this legislation gives the Secretary of Agriculture even more control over crops than he enjoyed under the defunct AAAct, which it replaces.

To finance the benefit payments to farmers who conserve their soil and consequently grow less of this crop or that, funds up to the $500,000,000 limitation will be raised by new taxes. Expected to take the form of excises on agricultural commodities, the taxes probably will be levied on the products formerly covered by processing taxes, plus a few others to broaden the base of taxation. Care will be taken to tax competing products so as not to favor one over the other.

There is doubt as to the constitutionality of the soil-conservation plan, but AAA insists that it will meet the test of the courts. In any event, the soil conservation features are temporary, and the permanent plan may involve cooperative organization in the individual states.

Meanwhile, the battle for the refunded processing taxes continues. In Kansas City, a federal district judge denied bakers a cut of the refunds to millers, holding that the bakers had no claim to the taxes inasmuch as they had passed them on to consumers. In Chicago, 30 meat packers face a suit by retailers for the recovery of $40,000,000. In Washington, the administration contemplates legislation to recover $200,000,000 of the taxes returned to processors.

Upholds Price Differential

"WE have believed that we should not be penalized because of having advertised to increase general appreciation of the value of milk." This is what H. A. Cronk, president of Borden's Farm Products Co., New York, thinks about the Supreme Court decision upholding the one-cent differential in the prices of advertised and unadvertised milk. "In instituting a suit to have this provision of the law set aside, we sought to make it possible for the public to buy milk of the highest quality at as low a price as any other milk," Mr. Cronk said.

In the opinion of the opposition, however, "the decision will enable the numerous independent milk dealers to remain in business in the sale of bottled milk to stores in the City of New York, and will prevent a loss of output to independent farmers who supply these dealers with milk."

In making its decision, the Supreme Court held that the price differential was something which had existed as a general trade practice prior to the enactment of the legislation, and that it therefore was neither unreasonable nor arbitrary, nor did it favor the independent dealers.

No Action on Food Bill

COPELAND'S food and drug bill will not pass this session. That is an opinion expressed recently by a high Food and Drug Administration official, who also ventures the assertion that the F&DA does not want the bill in its present form because it is weaker than the present law. Food and drug officials, however, have not lost hope that they might prevail upon Congress to strengthen the regulatory provisions.

One of the logical reasons for the food bill's failure to be enacted by this Congress is that this is to be a short session, with no time for this particular bill.

As a result of inactivity on the measure, rumors of all kinds have passed around. One report has it that the administration will not support the Copeland bill, not only because it believes it to be too "soft," but because it will save it for campaign material.

Conventions

MARCH

3-6—Sixth Packaging Exposition Pennsylvania Hotel, New York, N. Y.
9-12 — American Society of Bakery Engineers, Edgewater Beach Hotel, Chicago.

APRIL

20-22 — Southern Bakers' Association, Miami-Biltmore Hotel, Miami. Jos. Baker, 107 N. Conception St., Mobile, Ala., secretary.
20-24—Midwest Engineering and Power Exposition and Power Engineering Conference, Palmer House and International Amphitheater, Chicago, Ill. G. E. Pfisterer, 308 W. Washington St., Chicago, secretary.

To Protect Profits

AFTER discussing at several meetings the subject of fair profits on manufacturers' products for distributors, Associated Grocery Manufacturers of America decided something ought to be done. So the organization adopted a resolution to the effect that each grocery manufacturer give immediate and constructive consideration to the reported inability of the distributors in different markets to earn a fair, reasonable and living profit on the sale of numerous popular products of manufacturers. AGMA member companies are fully sympathetic with this problem of the distributors.

Welcome Wine Regulations

HAVING suffered for two generations from lack of proper regulations and standards, the wine industry looks hopefully to the new federal regulations.

These regulations broaden the term "wine" to include fruit and vegetable wines, requiring such products to be labeled with qualifications as to the materials from which they are made, this being one point which the wine industry does not like. Under the heading of "Standards of Identity," the regulations require sub-standard products to be labeled "imitation wines," "substandard wines," "concentrated wines," "raisin wine," and so forth. In California, where state regulations already have been established, health inspectors are ignoring the Federal Alcohol Administration's decision that Sherry may be as low as 17 per cent in alcohol by volume, or that Port or Muscatel may contain 18 per cent. All California wines, except sacramental wines, must contain at least 19.5 per cent.

The FAA takes the responsibility of ruling in the future as to which wine names are generic and which are geographic. While no rulings have been issued as yet, it is indicated that Port, Sherry, Burgundy, Claret, Chablis, Sau-

terne, Moselle, Chianti, Marsala and Madeira, will be approved as long as the name of the American viticultural region is stated in direct conjunction as in "California Chianti."

In attempt to provide the consumer and the trade with a term by which to distinguish fancy, select wines from every-day standard wines, FAA has created the term "vintage wine" as the name for wine made wholly from grapes gathered in the same calendar year and grown and fermented in the same viticultural area.

As a matter of insuring enforcement, FAA requires that anyone bottling or packing wine must have in his possession either a "certificate of label approval" or a "certificate of exemption from label approval," the latter obtaining when the wine is not moved in interstate or foreign commerce.

Ambitious Dairy Program

THREE perils confront the dairy industry, in the opinion of Representative Howard W. Smith. These constitute the lowering of duties on dairy products, the increasing competition of butter substitutes and the encouragement to domestic overproduction through agricultural adjustment programs. And with these dangers in mind, Congressmen friendly to the dairy industry have formed a committee to support an eight-point legislative program. This program includes amendment of the reciprocal trade act and the levying of a five-cent tax on oleomargarine.

Other legislation sought would maintain the present tax on imported fats and oils; prevent the use of interstate commerce as a means of evading state taxes on oleomargarine; and provide that no benefits be paid farmers using vacated acreage to increase production of dairy products.

Regulates Pastry Manufacture

TO TAKE the danger out of custard-filled pastry, the department of health in Westchester County, N. Y., has adopted regulations covering its manufacture and distribution. Effective March 15, these are applied under a permit system. They require the custard mix to be heated at 200 deg. F. for ten minutes, and then refrigerated at 50 deg. until applied to the pastry. Apparatus used subsequent to heating must be sterilized, and no one with a skin infection may handle the product. The pastry must be wrapped or packaged, with the label, "Refrigerate and Consume Today." None of the pastry may be sold except on the day of manufacture, and none may be sold between May 1 and Oct. 1 unless refrigerated at 50 deg. F. from time of manufacture to time of delivery to consumers.

Court Saves Packers

"MANY packers who otherwise would have been compelled to close their businesses, may now continue them," comments Wm. Whitfield Woods, president of the Institute of American Meat Packers, in summarizing the effects of the processing taxes and their invalidation.

"The money released by the Supreme Court's decision can repair in some part the damage done to processors, but this money cannot restore the solvency record of processors forced into bankruptcy," Mr. Woods continues. "Nor can it bring back the hundreds of thousands of customers weaned away because of the high price level."

By way of reconciling the unfortunate conditions in the industry with higher profits reported by a few pork packers, Mr. Woods points out that the profits earned were in other lines of business, such as beef, lamb, veal, hides, byproducts, butter, eggs and poultry.

The packers paid approximately $270,000,000 in processing taxes in 1933, 1934 and 1935, virtually all of which was used by the government to pay producers to curtail the supply of hogs and raise prices, in effect forcing the industry to finance a reduction of its own business.

All About Packaging

FROM some 4,000 packages introduced in the last year, representatives of the best have been entered and judged in the Wolf Award competition sponsored by American Management Association. The winners, chosen within twenty different classifications by a jury of packaging experts, will be exhibited March 3-6 at the Sixth Packaging Exposition in New York. After the exposition, they will be displayed at Harvard University.

But the prize packages will be by no means the whole show at the Exposition. Also on display will be the year's new developments in packaging machinery and materials, the products of some 70 companies.

And along with the visual display of packaging technic there will be a four-day session of conferences, clinics and round table meetings in which outstanding problems of packaging, packing and shipping will be analyzed by outstanding national authorities. The sessions will deal with currently important aspects of design and merchandising, packaging and shipping, materials and machinery. At the clinics, qualified authorities will sit in judgment on the "sick" and the "well" packages and outside containers. There will be brief pointed reviews of what's good and what's bad, with plenty of "how" and "why."

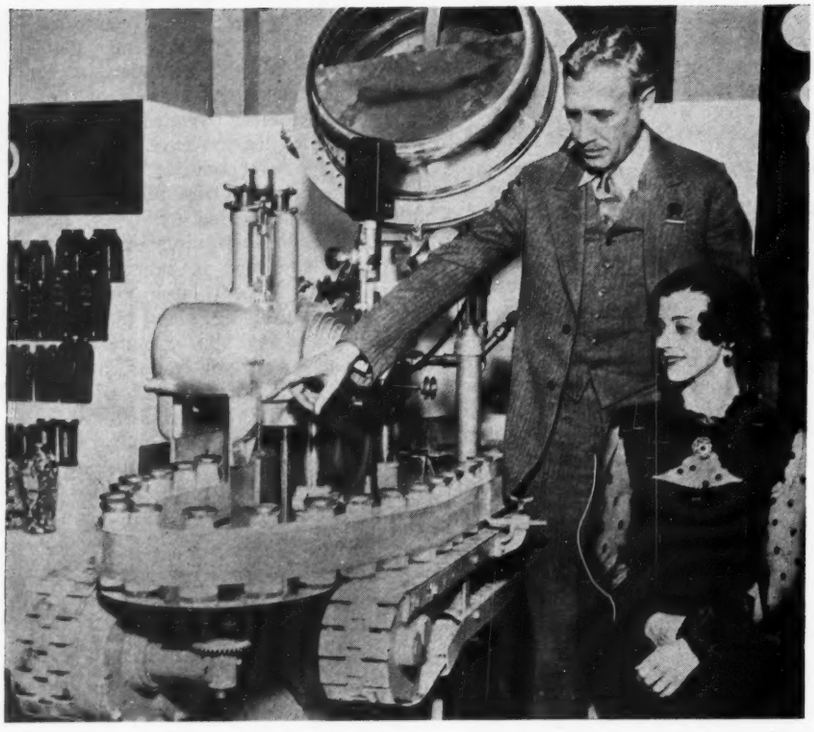
Iodine Protects Fruit

WHEN WRAPPERS for certain varieties of fruit are treated with iodine, fungal rotting is retarded without impairment of the appearance or flavor of the product. This has been discovered by the Food Investigation Board of the Department of Scientific and Industrial Research in Great Britain. Bunches of grapes wrapped in iodized paper were found to remain free from mold much longer than those wrapped in plain paper. The same applies to tomatoes

Harris & Ewing

SENATORS CELEBRATE

As soon as the Senate passed the soil-conservation bill drawn up to replace the AAAct thrown out by the Supreme Court, Senators interested in the farm vote got together for an exchange of "hurrah's!" The senator with raised fist, a la cheer leader, is Ellison Smith (S. C.). To the right of him are Senators Hattie Caraway (Okla.), George Norris (Neb.) and James Pope (Idaho).



Acme

SWEET FOR THREE MONTHS

William P. White demonstrates a method of bottling milk by which it may be kept fresh for more than three months. The trick is this: The capping chamber of the machine which applies the metal closures is filled with dry steam, the steam producing a vacuum in the bottle and sterilizing the cap and the surface of the milk. While the milk must be kept under refrigeration, the process may effect some change in methods of handling milk and in city ordinances requiring the product to be sold within 36 hours after bottling.

and oranges. The iodized wraps also reduce the brown rot of plums and peaches, but certain varieties of these fruits were adversely affected by the treatment, failing to ripen properly and even turning black.

CO_2 Preserves Bacon

AT LEAST three weeks can be added to the storage life of mild cured bacon when stored in gas chambers, according to a report on the successful use of carbon dioxide for preserving foods in the United Kingdom. The extent to which CO_2 is being used by the British is indicated by the fact that gas storage space for home-grown fruit has been quadrupled in the past three years. Also, a total of 4,400 tons of fresh beef arrived in England in gas storage from Australia and New Zealand during 1934.

To Discuss Bakers' Problem

WHAT to do about the decline in the consumption of bread will be a principal point of discussion at the convention of the American Society of Bakery Engineers to be held in Chicago, March 9-12. Henry Stude, president of American Bakers Association, will talk on "Turning Up the Bread Consumption Curve," and later in the program there will be a general discussion of the bread consumption situation. Then a report on this subject is to be presented by a committee of engineers who have collaborated with about 60 bakers in all sections of the country. The millers' point of view on bread consumption will be covered in a talk by Jesse B. Smith, president of Millers' National Federation.

Bread consumption, however, will be by no means the only subject discussed at the meeting. As in the past, the engineers will cover the technical and production problems of the baking industry.

One of the features of the convention will be an exhibit of baked goods. All bakers are invited to send samples.

Consumer Studies Go On

WALTON HAMILTON has quit his position as advisor to the President on consumer problems to take charge of the bureau of research and statistics of the Social Security Board. But this does not mean that the Administration is letting up on its emphasis on consumer problems nor tempering its investigations of and reports on industries. Before taking his new job, Prof. Hamilton picked his own successor, naming Clarence E. Ayres, a professor of economics at University of Texas. Professor Hamilton has credited his successor with a friendly attitude toward business, the truth of which assertion will be determined when his automobile price study is released.

The work of the consumer division will continue at least until July 1, 1937, it having a WPA project fund of $300,000 to finance it until that date.

Wineries Expand

CALIFORNIA wineries, after a record year in 1935, are planning many improvements during 1936. Earl Fruit Co. will be ready by grape harvest season with its Delano winery, said to be the world's largest with a capacity of 3,500,000 gal. Muscat Cooperative Winery Association, Kingsburg, has secured a $170,000 loan to construct additional storage vats, increasing its capacity to 1,500,000 gal. Sonoma County Winery, Windsor, and Florin Winery Association, Florin, have also secured loans for improvements.

Concentrates

▶ IN ALMOST every country, the diet of the average man is deficient in essential factors, according to findings by experts delegated by the League of Nations to make an investigation. . . . A House subcommittee has discarded the Walsh bill in favor of a plan which would merely "encourage" contractors with the government to maintain high labor standards. . . . From Sheffield, England, comes news of a new type of stainless steel comprising ordinary steel with a thin coating of the stainless metal, this being relatively inexpensive.

▶ WOODEN butter boxes are sprayed inside with a mixture of casein and formalin to protect butter quality and taste during storage and shipment under a method developed by the Dominion Department of Agriculture. . . . Borden Co. has found that one of the proteins of milk, lactalbumin, acts with vitamin D in irradiated milk to form a "simplex" more powerful in preventing rickets than either of the elements individually.

▶ MORE than fifteen of the largest sardine canners in Norway are packing their products in aluminum cans. . . . The Tariff Commission announces an increase from two to three cents a pound in the duty on frozen swordfish. . . . This year's Dairy Industries Exposition will be held in Atlantic City, N. J., the week of Oct. 12.

▶ STATE College of Washington's ninth annual institute of dairying will be held March 2-7. . . . Siebel Institute's two-month course in baking technology begins March 2. . . . A bill to tax oleomargarine five cents a pound has been defeated in the Vermont legislature.

Men . . . Jobs . . . and Companies

Industry

• American Fruit Growers, Inc., again is putting up grapefruit juice in tin cans. The company has done no canning since 1932.

• Angostura-Wupperman Corp., Jersey City, N. J., has acquired the Foster-Stewart Corp. factory building at Norwalk, Conn., and will transfer production operations there.

• Armour & Co. is believed to be planning an English company to acquire its South American properties. Such a plan would safeguard Armour against prospective inroads of British colonial and dominion meats in the English market. Armour has opened a cheese plant at Alice, Texas.

• Bartlett Frazier Co. has closed one of its Manitowoc, Wis., elevators with a capacity of about 1,000,000 bu., because of lack of business.

• Borden Co., New York, has dissolved four major sub-holding companies and taken over 37 of the smaller subsidiaries. The sub-holding companies involved include Borden's Food Products Co., Borden's Dairy Products Co., Inc., Borden's Ice Cream and Milk Co., Inc., and Borden's Cheese and Produce Co., Inc.

• Carnation Milk Co. has under construction at Sulphur Springs, Texas, a $250,000 plant which will have a capacity of 150,000 lb. of milk daily.

• Cudahy Packing Co. recently established a dairy and poultry processing plant at Mercedes, Texas, and it is planning a $10,000 addition to its vegetable-oil refining plant at Memphis, Tenn.

• Frosted Foods Sales Corp., New York, has increased its outlets on the North Atlantic seaboard from 450 to 1,250 in the past two years. The company is leasing a low-cost refrigerated case to selected retailers.

• Adolf Gobel, Inc., Brooklyn, N. Y., has received confirmation in federal court of a modified reorganization plan and of the release of $1,266,421 in processing taxes which had been impounded by Jacob E. Decker & Sons, a subsidiary sold recently.

• General Foods Corp., New York, has launched the largest newspaper advertising campaign ever scheduled for its cereal line. Comic-strip advertisements will be used heavily. Advertisements will appear in farm publications and general magazines and 131 premiums will be offered to boys and girls.

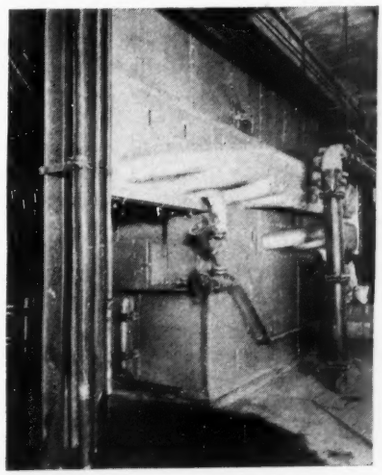
• General Mills, Inc., already has graduated three classes from the specialty bread school opened Jan. 13 in Buffalo. Three more will be conducted, carrying the school into April.

• Indiana Flour Co., Evansville, Ind., a General Foods subsidiary, will establish at Memphis, Tenn., a plant to manufacture burlap and cotton bags.

• Kraft-Phenix Cheese Corp. is studying dairying conditions in South America with a view to establishing trade connections and possibly plants there. The company has just introduced its biggest advertising program. Magazines, radio and newspapers are being employed.

• Maillard Corp. is moving production operations from Long Island City, N. Y., to Bethlehem, Pa., where it will use the plant of Just Born, Inc. All manufacturing will be carried on there.

• National Dairy Products Corp., New York, will spend more than $10,000,000 for new buildings and equipment in 1936. Construction will start at once on a $1,000,000 milk plant in St. Louis.



MORRELL'S $150,000 BOILER

Designed to produce 450,000,000 lb. of steam annually, this new 45-ft.-high boiler is the latest in pulverized-coal-fired steam plants. Draft fans mix coal and air and feed them into the combustion chamber at a constant speed, 120 tons of coal being consumed per day. Superheaters raise the steam temperature 100 deg. for distribution through the plant.

• Pet Milk Co. is building at Palmyra a new plant to be used as a receiving station for its Chicago plant.

• Pittsburgh Provision and Packing Co. is making a five-story addition to its plant at Herr's Island.

• Van Camp Milk Co., Indianapolis, is now out of receivership, all creditors having been paid in full and salaries having been increased.

• Van Camp Sea Food Co., Inc., Terminal Island, Calif., will spend this year something over $400,000 to promote the sale of tuna.

• Zitron Bros. Inc., Milwaukee packer, is spending $75,000 on improvements.

Personnel

• A. E. Anderson, former chief chemist and bacteriologist at the White House Milk Co. plant at Manitowoc, Wis., has taken a similar position with Great Atlantic & Pacific Tea Co., New York.

• J. W. Barnes, Paris, succeeds M. W. Anderson as president of Texas Bottlers' Association.

• A. M. Christopher has become manager of the Green Bay, Wis., branch of Swift & Co., succeeding M. Owens, transferred to Fond du Lac.

• John L. Deason again has been chosen president by Fletcher Coffee & Spice Co., Little Rock, Ark.

• Mark A. Fuller is president of Ohio Ice Cream Manufacturers' Association. A. L. Sprague heads up the Ohio Association of Creamery Owners and Managers.

• D. N. Geyer, until recently secretary of Pure Milk Association, Chicago, has gone with Hood & Sons Co., Boston, as a sales executive.

• Mario A. Gianini, formerly with Maillard Co., now is with Novia Candy Co., Inc., Brooklyn, N. Y., as production manager.

• E. F. Howe, president of Fairmont Creamery, Omaha, recently was honored for completion of 50 years of service.

His first job included starting the fire, soliciting and collecting cream, keeping books and selling butter.

• D. L. HUXTABLE, Champaign, Ill., has been elected president of Illinois Association of Ice Cream Manufacturers.

• STEPHEN JOSZA now is chief chemist for Fleischmann Malting Co. He had been with Fleischmann Laboratories as research chemist.

• J. G. KEHR, head miller of Russell Miller Milling Co., is the new chairman of the Buffalo district of Association of Operative Millers.

• E. S. LAFRANCE, Winona, Wis., again is president of National Pickle Packers' Association.

• BILLY MORGAN, JR., succeeds his father, W. O. Morgan, as president of Denison (Texas) Peanut Co. The father resigned because of ill health.

• HERVEY J. OSBORN has been elected by International Salt Co., Scranton, Pa., to the position of first vice-president. Harry M. Griffiths is second vice-president; John L. Ryon, vice-president and general sales manager.

• M. E. PARKER now heads up the research committee of American Association of Creamery Butter Manufacturers, Chicago.

• L. A. PELTON, general manager of Pompeian Olive Oil Corp., Baltimore, has been elected treasurer and a member of the board of directors.

• W. E. PIEPER, O. R. Pieper Co., Milwaukee, has been elected president of Wisconsin Association of Coffee Roasters and Jobbers.

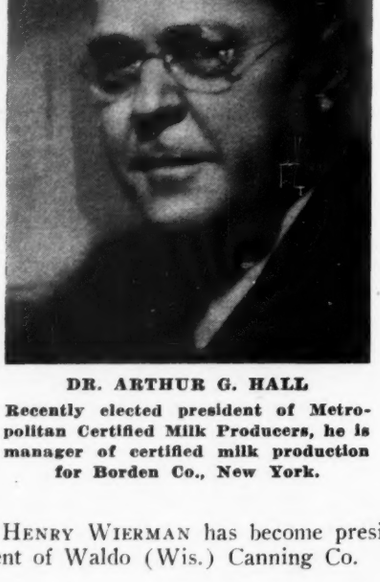
• WILLIAM F. ROBERTSON has terminated connections with Daggett Chocolate Co. to become plant manager for Howard Food Products Co., Inc., Andover, Mass.

• DR. C. F. SHOOK has become affiliated with Orange County Canners, Inc., Fullerton, Calif. He had been with Gibbs & Co., Inc., Baltimore, for several years.

• GEORGE TATE recently became president of Stayton (Ore.) Cooperative Cannery. George A. Smith, plant manager, was elected secretary.

• V. C. VANDERBILT has been elected president of Indiana Bakers' Association.

• RUSSELL L. WHITE is now a director of Kingan & Co., Indianapolis.



DR. ARTHUR G. HALL

Recently elected president of Metropolitan Certified Milk Producers, he is manager of certified milk production for Borden Co., New York.

• HENRY WIERMAN has become president of Waldo (Wis.) Canning Co.

• JOSEPH WOODS, manager of the Anheuser-Busch, Inc., yeast department in Buffalo, has been transferred to Brooklyn, N. Y. He is succeeded by J. J. McNamee, Jr.

Deaths

• WILLIAM BOHLMAN, superintendent of Libby, McNeill & Libby, Chicago.

• JOHN V. BRENNAN, superintendent of the package-supply department of Cudahy Packing Co., Chicago.

• A. A. BURR, 77, secretary of Waterloo Canning Co. and president of Waunakee (Wis.) Canning Co., Jan. 27.

• GEORGE A. COLLINGE, 64, a partner in Conneaut (Ohio) Meat Co. and vice-president of Cummins Canning Co., Feb. 12.

• CHARLES A. CORLISS, 67, chairman of the board of Peter Cailler Kohler Swiss Chocolates Co., New York, and president of Lamont, Corliss & Co., Feb. 9.

• CHARLES W. COSTELLO, 77, confectioner of Lisbon, Ohio, and former president of Pennsylvania State Confectioners' Association, Feb. 17.

• FERDINAND DRYFUS, 75, president of Dryfus Packing Co., Chicago.

• L. H. GALLAGHER, 51, purchasing agent for Swift & Co., Chicago.

• CHARLES H. KINNEKE, 64, secretary-treasurer of Froedtert Grain & Malting Co., Milwaukee, Feb. 5.

• ALBERT S. MURPHY, 52, production manager of Prince Macaroni Co., Boston, Jan. 31.

• DR. A. J. PISTOR, 59, chief of the meat inspection division of Bureau of Animal Industry, Jan. 25.

• EDWARD SMITH, 86, founder of Empire Provision Beef Co. and president of Edward Smith Packing Co., Feb. 16, at Buffalo, N. Y.

• HENRY J. WALSMITH, president and manager of Corbett Ice Cream Co., Denver.

Associated Industries

• AMERICAN CAN CO. has appointed R. M. Roberts assistant to the general manager of sales. H. O. Berryman has been transferred from Baltimore to New York as general sales representative for closing machines. Other changes at Baltimore are: F. D. Throop has been appointed manager of packers cans sales; Leonard D. Jenkins has been made district sales manager and W. W. Russell, assistant district sales manager. Frank J. Small has been appointed Eastern Shore sales manager with headquarters at Baltimore.

• CONTINENTAL CAN CO., New York, has established an experimental food bureau to provide housewives with data on dietary problems, to do research in the food field and to develop and test home recipes.

• CROWN CORK & SEAL CO., INC., has entered into an agreement to buy the outstanding stock of Acme Can Co., Philadelphia. The company has sold all the stock of Detroit Gasket & Manufacturing Co.

• DAIRY AND ICE CREAM MACHINERY AND SUPPLIES ASSOCIATION, New York, re-elected G. E. Wallis president.

• NATIONAL CAN CO. has appointed Thomas J. Bierne assistant local sales manager with headquarters at Chicago.

• PATTERSON FOUNDRY & MACHINE CO. has named Kenneth S. Valentine district manager at New York.

• REPUBLIC STEEL CORP. has appointed Charles W. East district sales manager at Houston, Texas, and has named R. H. Sonnenborn special representative of the tubular division.

• Z PROCESSES, INC., has been formed with offices at Jersey City, N. J., to acquire the business of American Z Corp.

Advertising Agencies

(Continued from page 110)

a shorter time than the average American advertiser, or the same time?

Do food advertisers change their agencies for the same reasons as other advertisers?

We find that food advertisers are in general just about as prone to use more than one advertising agency at a time as are other advertisers. In the food field the percentage of those who follow this practice is 21.4 as against 69.1 per cent for those who use only one and 9.5 for those who use no agencies at all. The percentages for the whole survey are, respectively, 20.2, 72.8 and 7.

However, the account-splitting tendency among food manufacturers is much more strongly concentrated in the large size groups than is the case in other lines. We find that 35.7 per cent of large food manufacturers split accounts, as against 29 per cent for large advertisers in general. In the medium-size group the percentage of food advertisers who split accounts is 30 as compared to 16.2, and in the small advertisers' group we find that only 7.2 per cent of them use more than one agency, whereas 15.3 per cent of small advertisers as a whole use more than one.

Of those food advertisers who split their accounts 77.8 per cent have *two* agencies, while only 72.1 per cent of all advertisers who divide their agency business use two.

The main reason why advertisers generally use more than a single agency is that they have more than one product and feel that two or more agencies will attend to the line better than can one alone. This is the reason given by 26.3 per cent of all account-splitting advertisers. The runner-up reason receiving 21 per cent of the mentions is that the added agency is used for export.

A somewhat different situation is found in the food field, however. Here 66.7 per cent of the advertisers who divide their agency business do so because they have more than one product, and there is no account-dividing to take care of export business.

The use of an extra agency to handle radio comes next in the list of reasons for account-splitting. This practice was found to be slightly more common among radio-using advertisers in general than among radio-using food advertisers, as 5.9 per cent of the former follow this practice as against 4.3 per cent of the latter. We discovered that 4.7 per cent of radio-using advertisers in general place radio appropriations direct, but none of the food advertisers interviewed do so.

The use of radio as a medium, on the other hand, was more prevalent in the food field, with 52.3 per cent of the manufacturers reporting its use, while only 46.2 per cent of advertisers as a whole employ this means of advertising.

Now, how long do advertisers retain their agency contacts in the food field and in general?

Our conclusion is that they retain them for materially shorter periods in the food industry than in industry as a whole. The average duration of an advertiser-agency relationship for all advertisers proves to be 6.3 years, but for food advertisers it is 4.8 years.

For all advertisers and food advertisers alike, the survey shows that the larger an advertiser is the longer he

Are you getting film-free, sparkling, CLEAN bottles day-in and day-out? You can . . . if you use Oakite materials designed for this specific purpose.

These materials have all the powerful, energetic cleaning action needed to remove dried or caked-on deposits in the normal time of immersion your bottle washing machine provides . . . and in addition, they possess such remarkable free-rinsing properties that no cloudy films remain . . . bottles glisten with real cleanliness. Equally important is that cost of washing is low.

Send for interesting new booklets describing various Oakite materials for bottle washing and also for cleaning food plant equipment, piping and vats. Free on request . . . no obligation.

Manufactured only by

OAKITE PRODUCTS, INC., 26C Thames St., New York

Branch Offices and Representatives Located in All Principal Cities of the U. S.

OAKITE

TRADE MARK REG U.S. PAT. OFF.

SPECIALIZED INDUSTRIAL CLEANING MATERIALS & METHODS

retains his agency contacts. Here is the summary for the food field:

Large advertisers	5.2 years
Medium-sized advertisers	4.8 years
Small advertisers	4.6 years

Among all advertisers we find:

Large advertisers	7.6 years
Medium-sized advertisers	6.5 years
Small advertisers	5.5 years

These data were computed from answers to the question: "How many advertising agencies have you had in the last ten years?"

Responses to this question, tabulated elsewhere, show also that food advertisers are only about half as prone to keep one agency for ten years as are most advertisers, even though they rarely employ a large number of agencies in that period.

Why are large advertisers' agency relationships the most stable, and why are those of food advertisers less long-lived than those of advertisers in general? For the answer to these questions one must consider much of the material to be presented in later articles, as well as the answers to the following query: "Why did you change to your present agency?"

The responses are given in detail in the table "Summary of Reasons Why Advertisers Changed to Present Agencies." Further analysis of them shows that food advertisers change agencies considerably more often through *dissatisfaction* with the old agency than do advertisers in general. In the food field the reasons for changes run like this:

Dissatisfaction with old agency	17.0%
Favorable impressions of new agency	10.0%
Both dissatisfaction with old and hopes for new agency	37.5%
Desire to follow a migrating contact man, agency failures, etc.	16.3%

The percentages for all advertisers are: 16.1, 22.4, 31.6 and 14.5, respectively.

PATENTS

Condiment Mixture Prepared From Salt, Citric Acid, Paprika, Pepper and Sugar—Erich Burst, New York, N. Y. No. 2,021,403. Nov. 19, 1935.

Honey Solidified by Heating at Temperatures Less Than 85 Deg. C. in Partial Vacuum and Allowing to Cool in Atmosphere With Relative Humidity of 45 Per Cent or Less—Victor J. Hampton, Guelph, Ont., Canada. No. 2,021,450. Nov. 19, 1935.

Food Coloring Prepared From Animal Blood Haemoglobin and Mono-Sodium Glutamate—Hugh E. Allen and Albert G. McCaleb, Evanston, Ill. No. 2,021,621. Nov. 19, 1935.

Fruit Prepared and Canned in Substantially Fresh Condition Under Vacuum By Continuous Method—Adolph K. Malmquist, Bellingham, Wash. No. 2,021,665. Nov. 19, 1935.

Rice With a Water Content of 15 to 30 per cent Subjected to Temperatures Below Freezing Point of Water Prior to Cooking by Passing Through Hot Water—Sam Harrison Gibbon, one-half to Steel Bros. & Co. Ltd., London, England. No. 2,021,721. Nov. 19, 1935.

Cheese Emulsified at Temperatures About 200 Deg. F. and Then Subjected to Vacuum Without Addition of Heat to Swell Casein Content—Ernest Schneider to Kraft-Phenix Cheese Corp., Chicago, Ill. No. 2,021,899. Nov. 26, 1935.

Sugar-Containing Syrups and Juices Treated With Isopropyl Alcohol for Recovery of Refined Non-Sugars—Gustave T. Reich, Philadelphia, Pa. No. 2,022,093. Nov. 26, 1935.

Milk Pasteurized and Deodorized by Mixing With Steam Under Pressure While Flowing Continuously Through Conduit With Restricted Outlet and Subsequently Released Into Compartment Under Reduced Pressure Permitting Separation of Vapor Phase From Liquid—Herman C. Horneman, Danville, Ill., to Research Laboratories, National Dairy Products Corp., Inc., Baltimore, Md. No. 2,022,419. Nov. 26, 1935.

Liquid Phase of Pasteurized and Deodorized Milk Scrubbed in Presence of Vapor Fog to Remove Remaining Odor-Imparting Substances—Bernard W. Hammer, Ames, Ia., and Herman C. Horneman and Milton E. Parker, Danville, Ill., to Sealtest System Laboratories, Inc., New York, N. Y. No. 2,022,420. Nov. 26, 1935.

Vitamin D. Concentrate Emulsified Through Use of Such Agents as Gum Tragacanth and Gum Acacia—Lloyd A. Hall, one-half to Carroll L. Griffith, Chicago, Ill. No. 2,022,464. Nov. 26, 1935.

Mixture of Granular Soluble Coffee and Granular Partly Soluble Coffee Packaged in Closed Porous Container—Wilbert A. Heyman, New York, N. Y. No. 2,022,467. Nov. 26, 1935.

Dry Pectin-Containing Material Prepared from Fruits and Vegetables Standardized by Addition of Diatomaceous Earth Filter Aid to Give Definite Jell Strength—Herbert T Leo, Clarence C. Taylor, and Frederick A. Beck, Anaheim, Calif. Nos. 2,022,470 and 2,022,471. Nov. 26, 1935.

Sugar-Containing Syrups and Juices Treated With Mixture of Ethyl and Isopropyl Alcohols for Recovery of Refined Non-Sugar Content — Gustave T. Reich, Philadelphia, Pa. No. 2,022,824. Dec. 3, 1935.

Margarine Made From Liquid Vegetable Oil Hydrogenated to be Solid at Room Temperature—Marvin C. Reynolds, Chicago, Ill. No. 2,022,924. Dec. 3, 1935.

Dry Soluble Lactalbumin Prepared From Whey—George E. Flanigan, and George C. Supplee, Bainbridge, N. Y., to Borden Co., New York, N. Y. No. 2,023,014. Dec. 3, 1935.

Butter Churn Built With a Churn Body Rotatably Mounted Inside and Air-Tight Casing With Closure of Opening Between End of Churn Body and Air-Tight Casing Under Spring-Valve Control — William Hamilton McCorkindale to Vacu Churns, Ltd., Auckland, N. Z. No. 2,023,056. Dec. 3, 1935.

Caffein-Free Coffee Prepared From Raw Beans by Extraction With Mixture of $\alpha\alpha$-Dichlorethane and $\alpha\beta$-Diochlorethane Under Constant Temperature — Jean MacLang-Geneva, Switzlerland, to Coffex A.-G., Neuhausen near Schaffhausen, Switzerland. No. 2,023,333. Dec. 3, 1935.

Flavor-Imparting Culture for Baked Products Prepared in Dry State From Acid Producing Bacteria and Moistened Flour After Allowing Mixture to Undergo Long-Period Dough Fermentation—Hans Wögerbauer, Vienna, Austria. No. 2,023,500. Dec. 10, 1935.

Dehydrated Fruits Dried Further Under Temperature and Pressure Control to Avoid Inversion of Fructose Content—Charles E. Moore, San Francisco, Calif., to Vacuodri Fruit Corp. No. 2,023,536. Dec. 10, 1935.

Excess Chocolate From Chocolate Coated Confection Automatically Recovered, Reheated, and Returned to Supply Compartment of Cating Machine—William Archibald Moir, St. Petersburg, Fla. No. 2,023,741. Dec. 10, 1935.

Pineapple Meats Mechanically Separated From Peel Preparatory to Canning—Albert Horner, to Hawaiian Canneries Co., Ltd., Kepaa. Kauai, Territory of Hawaii. No. 2,023,810. Dec. 10, 1935.

Loose Milk Handled in Closed Container and Dispensed in Predetermined Quantities—Harry J. Heins, Jersey City, N. J. Nos. 2,023,836 and 2,023,837. Dec. 10, 1935.

Flavoring Composition Composed of Solution of Diacetyl and Another Diketone of Aliphatic Hydrocarbon Series Containing Not Less Than Four Carbons Nor More Than Six in Each Alkyl Group And in Which the Carbonyl Groups are Adjacent to Each Other—Albert K. Epstein and Benjamin R. Harris, Chicago, Ill. No. 2,023,877. Dec. 10, 1935.

Method for Manufacture of Starch—Robert Edman Greenfield and Harold R. Baker to A. E. Staley Manufacturing Co., Decatur, Ill. No. 2,023,999. Dec. 10, 1935.

Milk Sterilized by Heating Out of Contact With Air to Temperature Above Normal Boiling Point and Under Pressure to Prevent Evaporation—John F. Russell, New York, N. Y. No. 2,024,255. Dec. 17, 1935.

Potato Chips Sliced With Grooves on Each Face—George F. Goodman, Jr., Philadelphia, Pa. No. 2,024,353. Dec. 17, 1935.

Partially Saponified Tri-glyceride Used as Stabilizer in Manufacture of Margarine—Benjamin R. Harris, Chicago, Ill. No. 2,024,355. Dec. 17, 1935.

Confection Composition Composed of Finely Divided Material Dispersed in a Fatty and a Water-Absorbing Aliphatic Derivative of Polyhydroxy Ingredient Having at Least One Free Hydroxy Group and the Aliphatic Radical Having at Least Six Carbon Atoms—Benjamin R. Harris, Chicago, Ill. No. 2,024,356. Dec. 17, 1935.

Cake Batter Emulsion Composed of Flour, Sugar, Shortening, Water-Containing Liquid and a Water-Absorbing Lipin—Benjamin R. Harris, Chicago, Ill. No. 2,024,357. Dec. 17, 1935.

Whole Grain Corn Cutter—John Schmidt, Buffalo, N. Y., to Food Machinery Corp., San Jose, Calif. No. 2,024,391. Dec. 17, 1935.

Lecithin Prepared From Vegetable Raw Materials—Samuel O. Sorensen and George F. Beal, Minneapolis, Minn., to American Lecithin Co. of Ohio. No. 2,024,398. Dec. 17, 1935.

Lactic Acid Prepared From Carbohydrate Material Heated With Strong Alkali at Temperatures Above 199 deg. C. and Pressures Above at Least 20 Atm. by Treating With Zinc Sulphate for Recovery of Zinc Lactate Through Cooling and Crystallization—Geva Draun to Standard Brands, Inc., New York, N. Y. No. 2,024,565. Dec. 17, 1935.

Margarin Made By Chilling Mixed-Fat Base Prior to Addition of Milk Component and Depositing Mixture Under Pressure Into Final Package—Adrian D. Joyce, Cleveland, Ohio, to Durkee Famous Foods, Inc., Elmhurst, N. Y. No. 2,024,647. Dec. 17, 1935.

Dates and Other Dried Fruits Prepared for Market by Packaging in Cartons Having Transparent Top Unaffected by Heat and Moisture But Which Does Not Interfere With Heat and Humidity Transfer During Pasteurization—Arthur B. Schell, Plainfield, N. J., to Hills Bros. Co., New York, N. Y. No. 2,024,809. Dec. 17, 1935.

Alimentary Paste Goods and Baked Products Made From Milled Germinal Materials of Ceratonia Siliqua Seeds—Moritz Bienenstock, and Ladislaus Csáki, Budapest, Hungary, Julius Pless, Bratislava, Czechoslovakia and Adalbert Sági and Eugen Sági, Budapest, Hungary. No. 2,025,705. Dec. 31, 1935.

Cheese Shaped Into Brick Form—Raymond Miollis, Elgin, Ill. No. 2,025,213. Dec. 24, 1935.